OCTOBER 1, 1951

STEEL

THE WEEKLY MAGAZINE OF METALWORKING

Where the Steel Is Coming From

. . . *Statistics on Page 121*

ECONOMIC BUTTRESS
—High Capital Expenditures, p. 35

TOOL GIFT FROM GOVERNMENT?
—Reserves Leased, Not Given Away, p. 37

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FORMING, MACHINING TITANIUM
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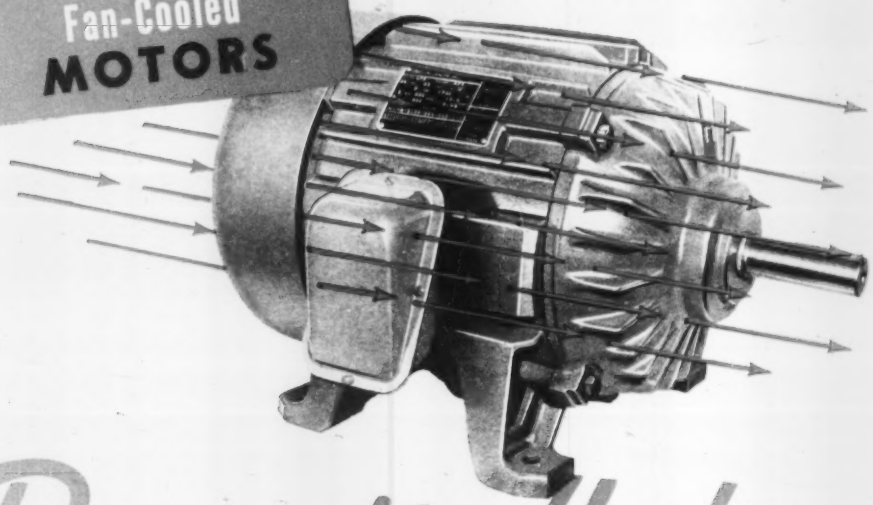
ALLIS-CHALMERS
Totally-Enclosed Fan-Cooled MOTORS



Blows itself clean as a Whistle!

DIRT IS CARRIED AWAY by cooling air blown over the ribbed cast iron frame and bearing housings of this new Allis-Chalmers tefc motor. That means less motor cleaning . . . inspection . . . overhaul!

Concealed air passages and pockets have been eliminated. Dirt can't build up to cause overheating. And as for oily dirt that sticks — just wipe or blow it off.

Studies show that on most applications, totally-enclosed fan-cooled motors more than pay back their extra cost in reduced maintenance. And this new Allis-Chalmers Type APZ tefc motor makes maintenance costs lower than ever before.

Rigid Construction

The frame is cast iron which has high resistance against corrosion and distortion. Bearings are pre-lubricated at the factory and should need no attention for years. Tapped holes with pipe plugs to permit regreasing and to provide grease relief are standard equipment.

Get All The Facts

The new Allis-Chalmers Type APZ totally-enclosed fan-cooled motor is built in all NEMA standard frame sizes from 224* to 505. Also in explosion-proof type. Your A-C Authorized Distributor or District Office has complete information. Call today, or write Allis-Chalmers, Milwaukee 1, Wisconsin. Ask for Bulletin 51B7225.

A-3427

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CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

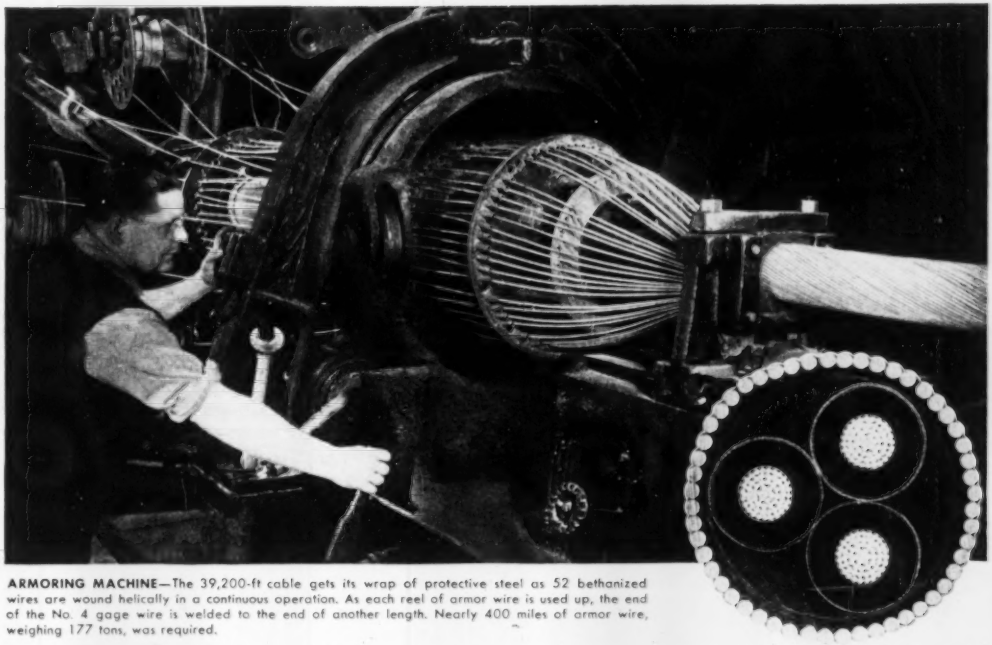
T2XROPE — Belts in all sizes and sections, standard and Vari-Pitch sheaves, speed changers.

PUMPS — Integral motor and coupled types from $3_{/4}$ in. to 72 in. discharge and up.

Texrope and Vari-Pitch are Allis-Chalmers trademarks.

ALLIS-CHALMERS A-C

*Similar design non-ventilated motors Type APK, also available in frames 203 to 224 inclusive.



ARMORING MACHINE—The 39,200-ft cable gets its wrap of protective steel as 52 bethanized wires are wound helically in a continuous operation. As each reel of armor wire is used up, the end of the No. 4 gage wire is welded to the end of another length. Nearly 400 miles of armor wire, weighing 177 tons, was required.

BETHANIZED WIRE Armors Largest High-Voltage Submarine Cable

A 25,000-volt power cable, the largest of its kind ever made, was lowered to the bottom of Puget Sound early in May. Capable of transmitting 27,000 hp, it will feed Bonneville electric power to the San Juan island group. Engineered and made in one 7½-mile length by The Okonite Company for the Bonneville Power Administration, the 4.6-in. diameter cable has an armor made up of 52 bethanized steel wires.

The helically wound steel wire greatly strengthens the cable, takes up the stresses incurred in handling, and protects it against damage when submerged.

INSIDE STORY—The giant power cable, 4.6 in. in diameter, has an outer armor of 52 bethanized wires, each about ¼ in. in diameter. Each of the three stranded copper conductors is insulated with rubber insulation and clad with a metal shielding tape. Spaces between conductors are filled with jute and bound with heavy tape prior to the armoring operation.

The high corrosion-resistance and ductility of the bethanized coating make bethanized wire ideal for a wide variety of uses, especially where long coating life is needed. In the bethanizing process, 99-pct-pure zinc is deposited atom by atom in a uniform, tightly bonded jacket. Twist it, bend it, even draw it through dies—the ductile zinc refuses to crack, flake, or peel off. It's a coating that can take a lot of punishment.

HUGE RAIL SHIPMENT—Probably the largest item of railroad freight ever handled in one piece, the 375 tons of cable posed quite a shipping problem because of its 7½-mile length. A length of about 4400 ft was coiled in each of the nine gondolas, then the cable was looped over into the next car.

Photos courtesy The Okonite Co., Passaic, N. J.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

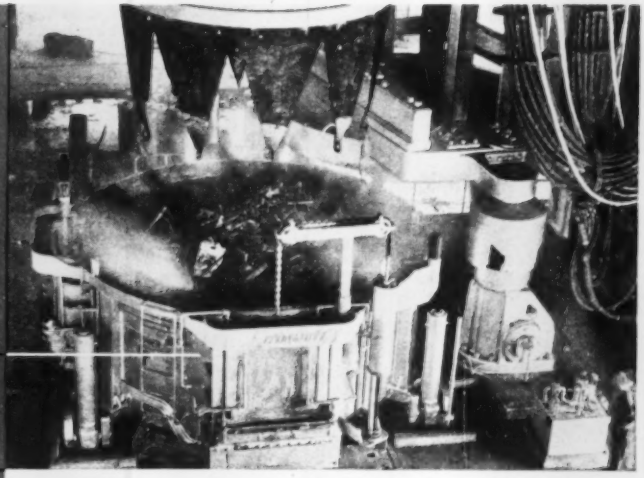
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

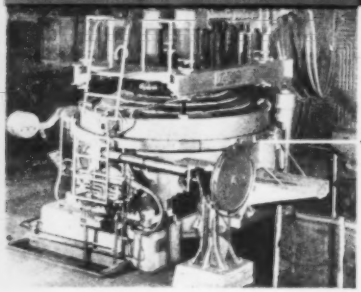
BETHLEHEM WIRE

★ BETHLEHEM STEEL ★

if you need 'em

BIG





...if you need 'em little

LECTROMELT Builds Furnaces up to 150-ton Capacity

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Lectromelt furnaces offer you all these additional moneysaving advantages: engineered and correlated electric power system; counterbalanced electrode arms; oil-bearing-mounted top structure; side-mounted tilting mechanism.

We'd be glad to talk over your melting, refining, smelting and reduction problems. Just write Pittsburgh Lectromelt Furnace Corporation, 323 32nd Street, Pittsburgh 30, Pennsylvania.

Manufactured in . . . CANADA: Lectromelt Furnaces of Canada, Ltd., Toronto 2 . . . ENGLAND: Birlec, Ltd., Birmingham . . . SWEDEN: Birlec, Elektkaugnar A. B, Stockholm . . . AUSTRALIA: Birlec, Ltd., Sydney . . . FRANCE: Stein et Roubaix, Paris . . . BELGIUM: S. A. Belge Stein et Roubaix, Brossoux-Liege . . . SPAIN: General Electrica Espanola, Bilbao . . . ITALY: Forni Stein, Genoa.

WHEN YOU MELT... MOORE RAPID *Lectromelt*

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

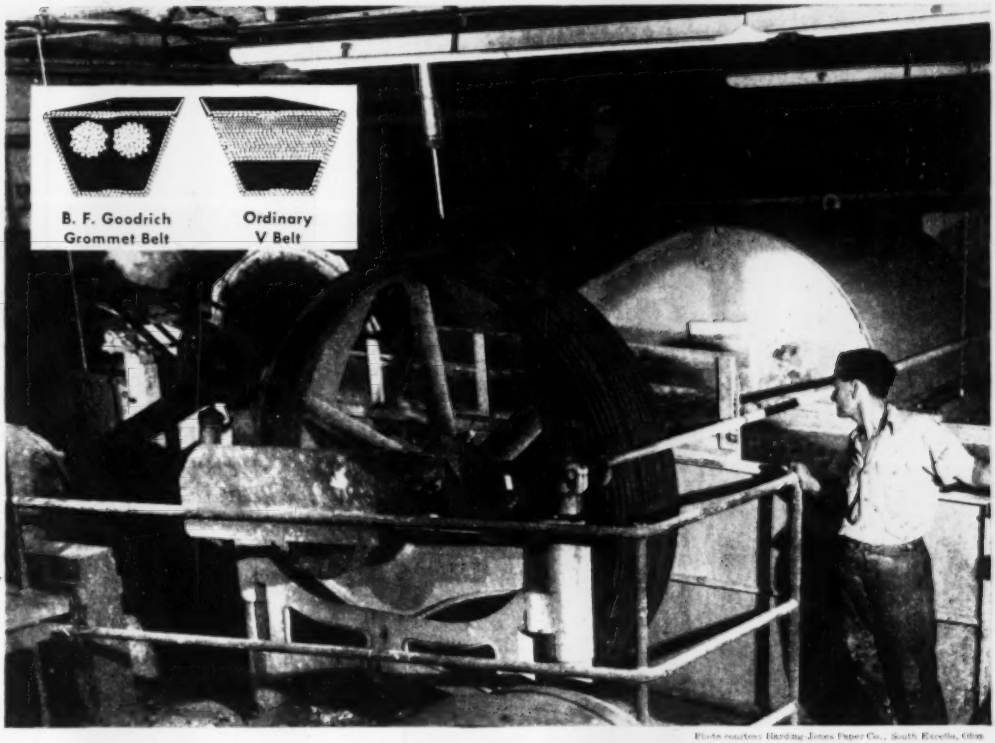

Photo courtesy Harding-Jones Paper Co., South Everett, Ohio

Drive headache cured with B. F. Goodrich grommet belts

B. F. Goodrich grommet V belts cut costs 20 to 50%

HERE was one of the biggest drive problems in this plant. The machine shown in the picture runs 24 hours a day, 7 days a week. Belts previously used couldn't handle the job. Motor bearings were burning out, belts were snapping under the shock load.

Then a B. F. Goodrich distributor suggested grommet belts to stand the jerks and hard pulls. Installed nine months ago, B. F. Goodrich grommet belts are still going strong, and look good for many more months of use. Here's why BFG grommet belts give longer service, save maintenance costs:

Endless — A grommet is endless, made by winding heavy cord on itself to form an endless loop. It has no overlapping cord sections. Because most of the failures in ordinary V belts occur in the region where cords overlap, the endless grommet belt eliminates such failures.

Concentrated cord strength — All of the cord material in a B. F. Goodrich grommet belt is *concentrated* in twin grommets, positioned close to the driving faces of the pulley. No layers of cords to rub against one another and generate heat; cord and adhesion failures are reduced.

Better grip, less slip — Because a grommet is endless, a grommet belt is more flexible, grips the pulleys better. Size for size, grommet belts will give ⅓ more gripping power, pull heavier loads with a higher safety factor.

Only B. F. Goodrich makes the grommet! — No other multiple-V belt is a grommet belt (U. S. Patent No. 2,233,294). Now available in C, D and E sections. See your local B.F.Goodrich distributor. Ask him to show you his "X-ray" belt that illustrates grommet construction clearly. *The B.F.Goodrich Company, Industrial & General Products Division, Akron, Ohio.*

Grommet Belts BY

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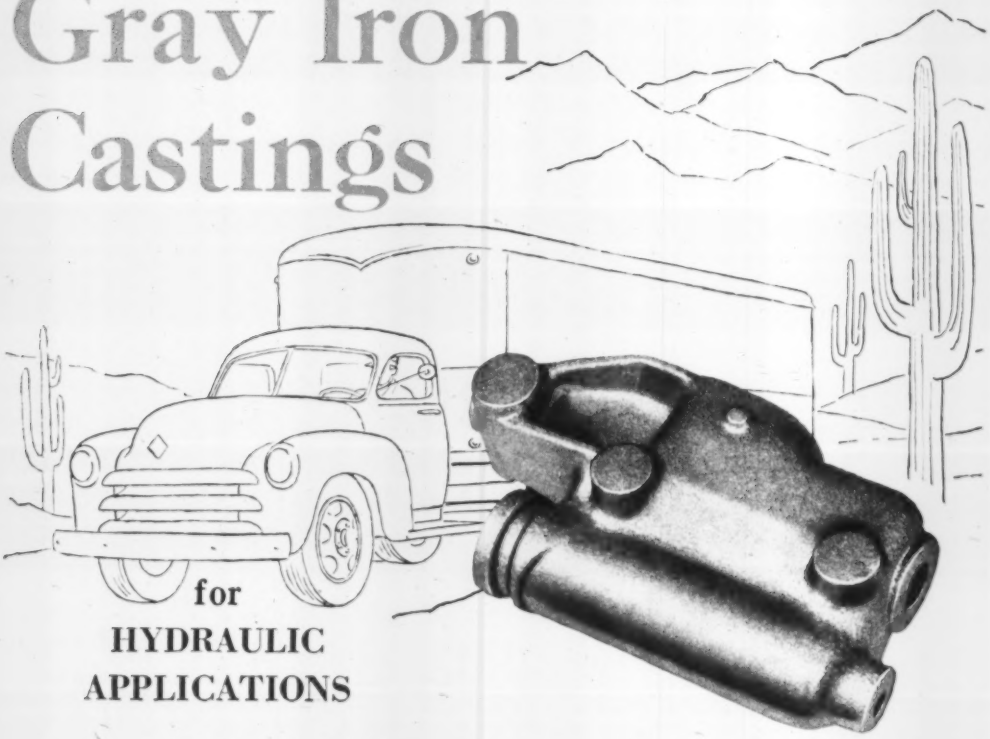
Eaton Permanent Mold Gray Iron Castings



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STEEL
The Weekly Magazine of Metalworking

VOL. 129 NO. 14 OCTOBER 1, 1951

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Editorial and Business Staff—Page 10. Advertising Index—Page 160. Editorial index available semiannually. STEEL also is indexed by Engineering Index Inc., 29 West 39th St., New York 18.

Next Week **... One World in Metallurgy? ... Who Has the World's Metals? ... Critical Materials—What You Can Do About Them ... National Metal Congress Program**

Published every Monday by the Penton Publishing Company, Penton Building, Cleveland 13, Ohio. Subscription in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $10; two years $15; all other countries, one year $20. Single copies (current issues) 50 cents. Metalworking Yearbook issue $2.00. Entered as second class matter at the postoffice in Cleveland, under the Act of March 3, 1879. Copyright 1951 by Penton Publishing Co.

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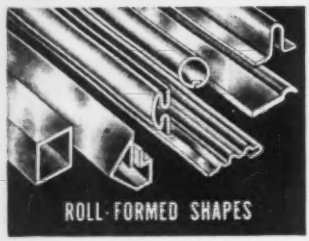

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Behind the Scenes...

New Job

The boss man, Editor Irwin Such, just took on a new job. He became president pro tem of the Society of Business Magazine Editors, an organization with more than 110 members throughout the United States. He succeeds John W. McPherrin, former editor of *American Druggist* and now vice president of Crowell-Collier Publishing Co. and publisher of *American Magazine*. Irwin was first vice president of the society which has its headquarters in Washington.

Progress Note

Walking into the Chicago office of Inland Steel Co. the other day, we were pleasantly surprised to hear soft overtones of soothing music above the clatter of typewriters and business din. Upon inquiry, we learned that Inland is piping in the music from a local FM radio station. It's not a captive audience though: Various office sections put the music question to a vote. Excellent results are reported in worker comfort and productivity. One reason why the music is favored: All commercials are automatically deleted.

Out of This World

Anticipating the rush for reservations on interplanetary space ships almost any decade now, the Toledo Scales people are pulling away ahead of the competition. They've put out a little card showing how much you'll weigh on various planets.

Perhaps they were spurred to get their foot in the door by noting proceedings of the International Congress of Astronautics at its London meeting this year. Dr. Werner von Braun, designer of the V-2 bomb for the Germans and doubtless a man not given to levity, presented an outline for a three-year trip to Mars.

We can foresee a whale of a business for the scales people when the universe is opened up for scientists and businessmen wanting to get away from their petty down-to-Earth problems. If you plan to take your wife on the Mars expedition, she'll be overjoyed to know that her poundage there will be less than half the amount she admits to on Earth. Of course her space helmet must be figured in; scientists say it's inadvisable to remove them on other planets even for such an important ceremony as determining one's corpulence. This makes us wonder how boxers could make a living in such places.

If you're worried about your wife's tipping the scales near the 150 mark, just think what she'd be on the sun: A two-ton monster — if she could stand the heat.

Want to know what you'll weigh on a visit to other worlds? If the moon is your destination, multiply your present weight by 0.16. On Venus you'll register 0.85 of your normal mark; Mars, 0.38; and Jupiter, 2.64.

Reference Work

If you come across any sweat marks between pages 121-136 of this issue, it's likely to be from the brow of Associate Editor Vance Bell. He has been working feverishly of late putting together the 16-page compilation "Steel Industry Statistics." A summary and analysis of American Iron & Steel Institute's "Directory of Iron and Steel Works of the United States and Canada" (last published in 1948), it tells where steel, pig iron, coke and rolling mill products are coming from and in what amounts. Figures in this work show clearly the effect of the big demand for durable goods in the postwar era and the trends brought on by defense needs. Reprints will be available.

Puzzle Corner

Puzzle in last week's issue was really a stickler: Find the puzzle. So concerned were we with problems of our puzzlers that we neglected to give them more food for thought.

Answer to the Sept. 17 problem is 3 seconds. Correct answers came from Ralph Pappenheimer, The Specialty Device Co.; J. H. Bowman, Wheeling Steel Corp.; L. B. Slapleigh, Bethlehem Steel Co.; and C. E. Blass, Talon Inc.

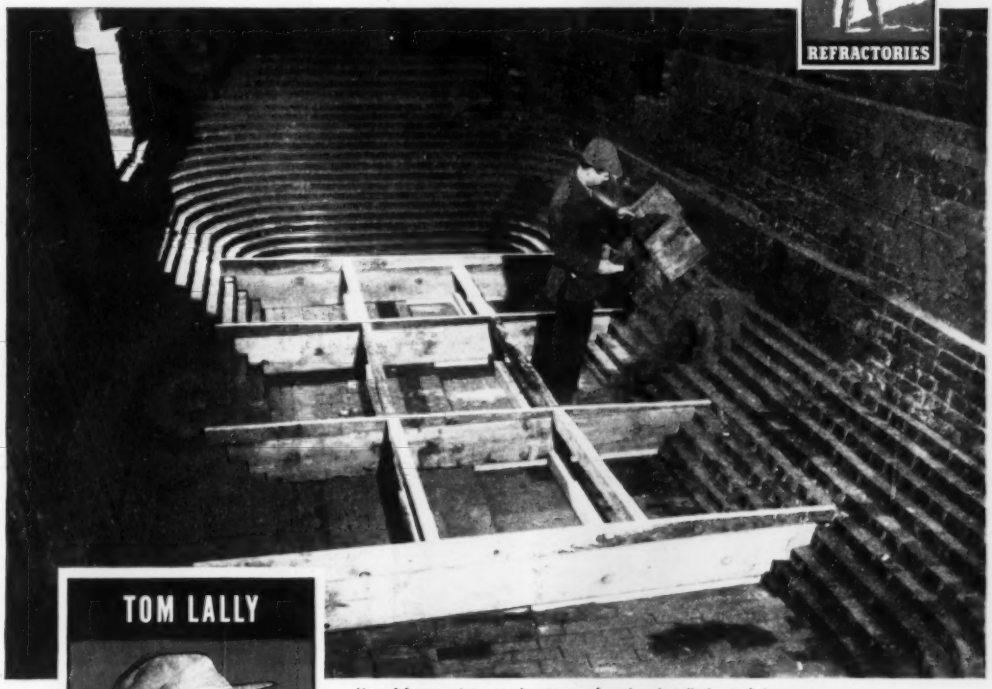
Try this one, sent in by Lt. Comdr. A. R. Simpson. Three racing automobiles are tested on a proving ground. It is known that the speed of Car A is 10 miles per hour more than the speed of Car B, and 10 mph less than that of Car C. Starting at the same time, the three cars cover the entire length of the proving ground. Car B arrives 10 minutes after A; and C finishes 8 minutes and 45 seconds before A. What is the speed of each car and what is the length of the course?

Shrdlu

(Metalworking Outlook—Page 27)

Basic values behind the trade mark

BASIC FURNACE REFRACTORIES



Use of forms points up advantages of modern installation technique —faster ramming, increased density and better hearth contour.

Tom Lally, who is checking hearth dimensions in the picture above, knows granular basic refractories. He also knows open hearth problems because he made steel for 17 years before joining our staff.

MODERN INSTALLATION TECHNIQUE

A FAMILIAR trade mark identifies a dependable product. But quality of product is only one of the values that stand back of the "man with the shovel."

If you have a rammed hearth in your shop, you have first hand knowledge of one of these additional values. Basic pioneered the rammed hearth installation procedures now accepted as standard. *One innovation was the use of forms to shape hearth contour accurately and to obtain maximum density, particularly in banks.*

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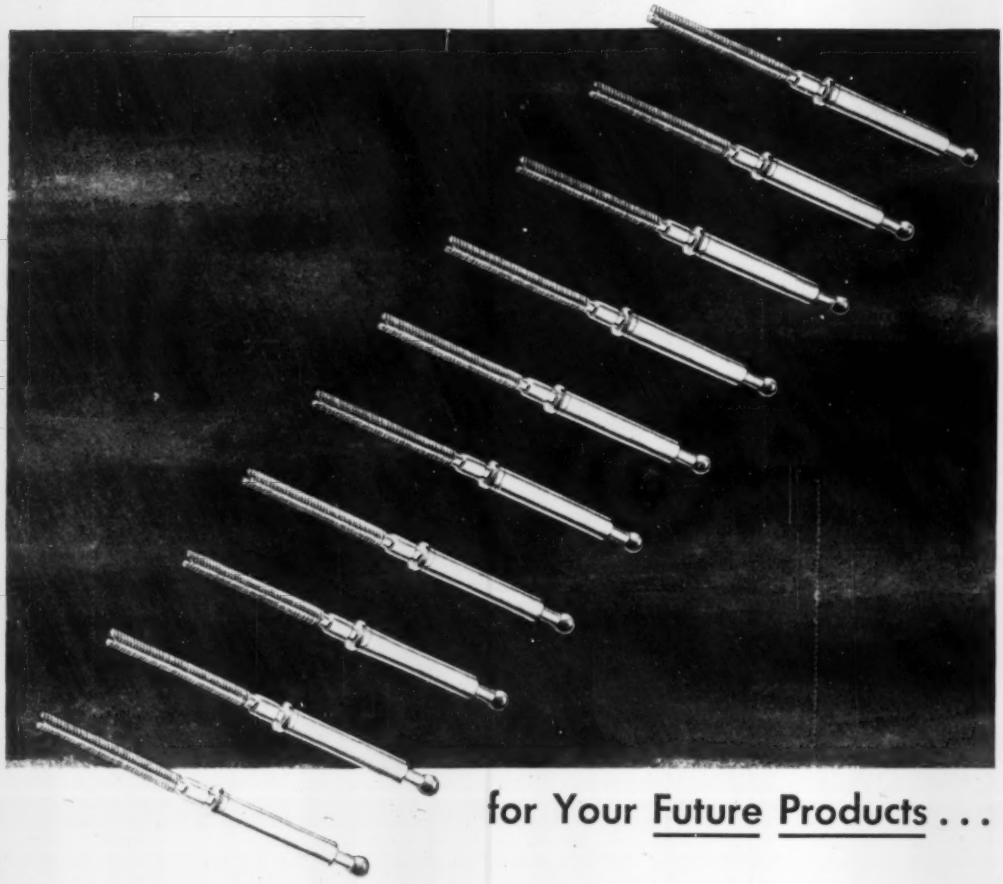
A Stainless Job That Points to Success



for Your Future Products . . .

When your talk gets around to Stainless for your own future products, this Stainless job points the way to giving you extra advantages. It shows why it pays to consider Carpenter for Stainless that will do the unusual.

Take a second look at this job, for example. Tolerances were close, and had to be "on the nose" every time. Finishes had to be "perfect", to insure accurate operation. And like all other precision jobs, the parts had to be produced with minimum rejects.

In today's planning for the future, if you have the problem of recommending a Stainless that will give you something extra in performance or in production, it's a good idea to call Carpenter. Put Carpenter's experience with Stainless to work on *your* jobs.

Helping engineers get improved or unusual results with Stainless is our favorite job. From the time the first free-machining Stainless was invented in Carpenter's laboratories, we have been developing new Stainless Steels and improving old ones. They are described in "Working Data for Carpenter Stainless Steels". Let us know if you would like a personal copy.

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says Herman Busch
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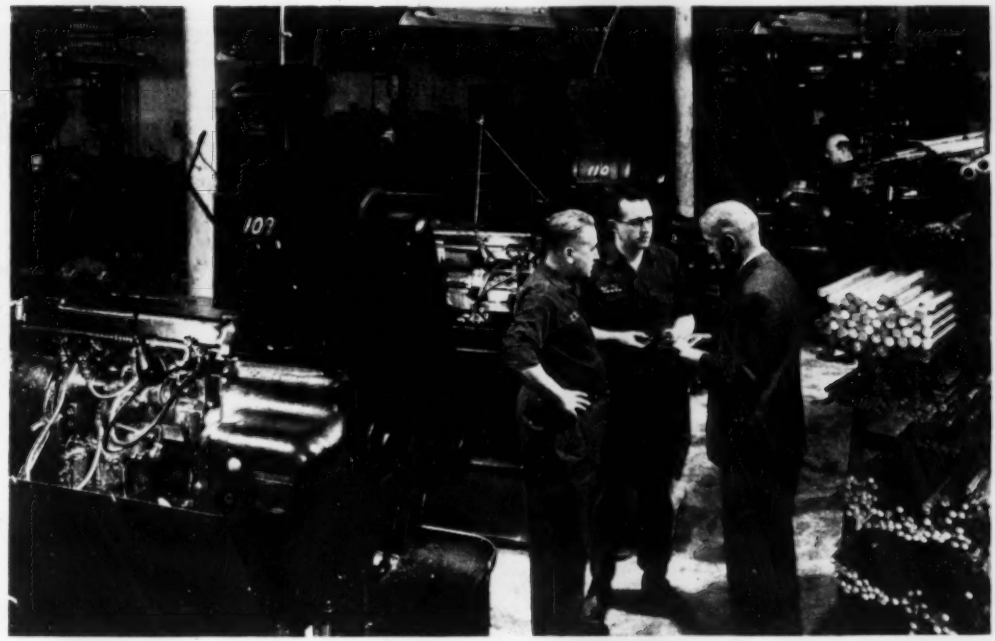

"We've found that the new Gulf Electro Cutting Oil is ideal for all-round service on 6-spindle automatics," says Mr. Herman Busch, President, Buswell Metal Products, Inc., Kensington, Conn. "On tough stainless steel ball races, for example, we've increased tool life from 5 to 8½ hours and we're getting excellent finishes with this outstanding cutting oil."

This is typical of reports from the scores of plants which have made some improvement in production or tool life through the use of Gulf Electro Cutting Oil, the new sulphurized cutting oil that, because of greater sulphur activity, provides better protection for the tool.

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WHEN YOU ORDER MATERIALS FROM

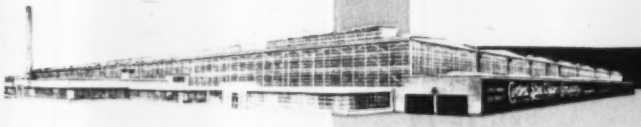
CENTRAL STEEL
AND WIRE COMPANY

Your Call Brings Fast, Dependable Delivery Anywhere in the Middle-West

With our cut-to-order service, order-filling, loading and delivery facilities geared to meet the expanding requirements under mobilization, a steady stream of materials is flowing out of our four strategically located warehouses to industrial plants all over the Middle-West.

Right now, when time is of the essence, this fast, dependable service may be important to you in keeping your production line moving or in meeting finished work schedules.

Regardless of your requirements for Carbon, Stainless or Alloy Steels, Brass, Copper and Aluminum, call Central Steel *first*—we will welcome an opportunity to serve you.



Hot Rolled • Cold Finished
Carbon & Alloy • Stainless
Copper • Brass • Aluminum
Expanded Metal • Structurals

All materials are available at published prices

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"REJECTS CAN BE MINIMIZED WITH THE RIGHT CUTTING FLUID"

THERE is always one *right* cutting fluid for every machining job — one that will do the job better or faster, or both. Take Rudolph's problem of *rejects*. Here is what one company did about it.

THE OPERATION. Grinding the bearing surface and shoulder on engine camshafts of RC60 hardness.

MACHINES AND WHEELS. Camshaft Grinders with 80 grit wheels.

STOCK REMOVAL. Remove .036" on bearing surface and .012" to .020" on side of shoulder.

PREVIOUS RESULTS. Wheel face dressed after 8 pieces, wheel sides after 3 pieces. *Scrap loss 18%.*

WITH STUART GRINDING OIL. Wheels dressed on face and sides after 18 pieces. *No scrap loss.*

You can secure benefits like this. Ask to have a Stuart Representative call.

Are you receiving Stuart's Shop Notebook regularly?

CONSERVE CRITICAL MATERIALS

Use the RIGHT Cutting Fluid

Metal Show Detroit Oct. 15-19 Visit STUART BOOTH No. A-266

D.A. Stuart Oil CO. EST. 1865 LIMITED

2735-37 South Troy Street, Chicago 23, Illinois

LETTERS TO THE EDITORS

Melting Aluminum

STEEL describes a two-compartment, gas fired melting furnace for aluminum, "designed to provide the advantages of a two-chamber induction furnace, minus the hot metal agitation"—(Aug. 13, p. 73). We will be pleased to learn name and address of manufacturer of the unit noted in this item.

W. S. Peterson, head
Physical Chemistry Dept.
Kaiser Aluminum & Chemical Corp.
Spokane, Wash.

We will appreciate further information on this two-chamber, gas fired melting furnace, with particular reference to the ceramic coating used.

O. L. Mitchell
Chief Plant Metallurgist
Extrusion Division
Reynolds Metals Co.
Phoenix, Ariz.

• *Contact Stewart C. Parker, Chairman, Metals Committee, American Gas Association, 420 Lexington Ave., New York 17.*

The Story on Scrap

This agency needs 2000 copies of STEEL's cover article, "If You Can't Use It, Scrap It"—(July 23, p. 37). If reprints are unavailable, will STEEL grant permission for us to duplicate the article by multilith?

T. E. McGraw, chief
Purchase, Stock and Supply Service Section
Administrative Services Division
National Production Authority
Washington

• *Copies forwarded.*

Permission Granted

Many thanks for your editorial, "Out of Control"—(STEEL, Aug. 27, p.39). We seek permission to reprint this article in a local newspaper, and will appreciate your sending 500 copies for our outgoing mail.

S. J. Kelly
Minerva Oil Co.
Eldorado, Ill.

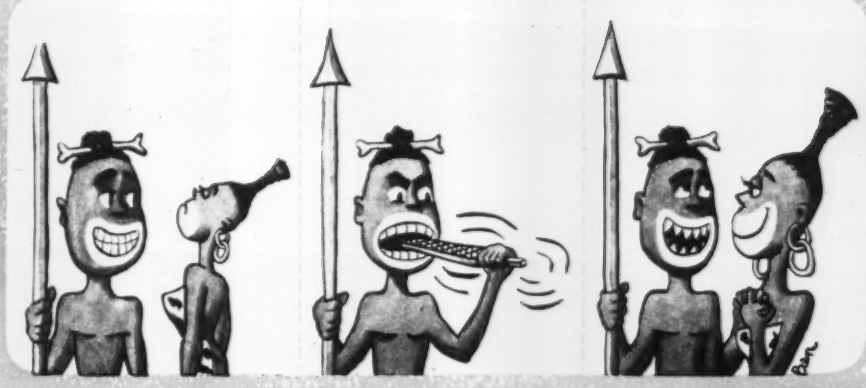
Synthetics for Nickel

STEEL's interesting article, "What Platers Can Do About the Nickel Shortage," (Apr. 2, p. 81) mentions clear, synthetic protective coatings. Can you refer us to a supplier of these synthetics?

P. W. Patton
National Research Corp.
Cambridge, Mass.

• *Contact either Hercules Powder Co. or E. I. du Pont de Nemours Co., both of Wilmington, Del. Further, the use of such lacquers over plated surfaces has been pioneered by United Chromium Inc., Ferndale 20, Mich.*

"A Nicholson File for Every Purpose" is the caption over which this cartoon appeared in one of a series of advertisements in The Saturday Evening Post.



The right teeth make a big difference

Enlarged "horizon" (cross section) of the teeth of a typical Nicholson file.

How to select, use and care for *The right file for the job* is interestingly described with words and pictures in Nicholson's famous 48-page book, "FILE FILOSOPHY." FREE . . . send for as many copies as you can judiciously place in the hands of your key production and purchasing personnel.

Proper design, even height, uniform sharpness and correct hardening of teeth are tremendously important in lengthening the life and increasing the efficiency of files. Such qualities take on added significance as defense preparedness calls for production speed-ups, steel conservations and maximum tool wear. They are "naturals" in Nicholson products.

Nicholson file manufacture has *always* given uppermost thought to the designing, cutting and heat-treating of the myriads of tiny teeth which constitute the vital "business ends" of one of industry's most indispensable hand tools.

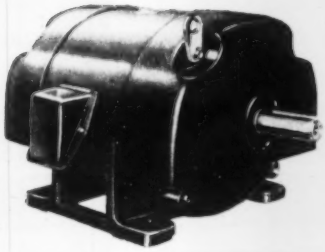
Thus, it can be said that Nicholson and Black Diamond files "speak through their teeth." And what they say is, "*Twelve perfect files in every dozen*—made from top-quality file steel and 87 years' experience."

Sold through industrial distributors throughout the world.

NICHOLSON
A FILE FOR EVERY PURPOSE

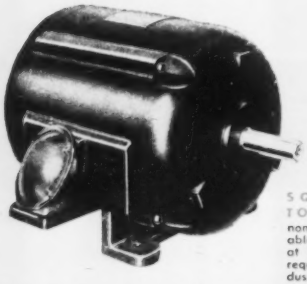
NICHOLSON FILE CO. • 71 ACORN STREET • PROVIDENCE 1, RHODE ISLAND
(In Canada, Port Hope, Ont.)

The RIGHT motor



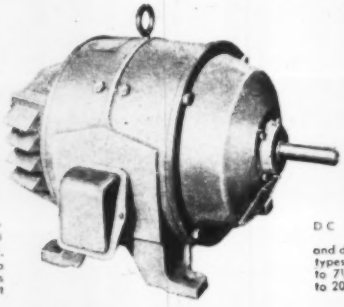
SQUIRREL-CAGE SPLASHPROOF

Form BA. Has corrosion-resistant covers which prevent entrance of splashing liquids.



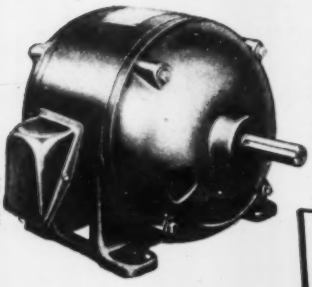
SQUIRREL-CAGE, TOTALLY-ENCLOSED

non-ventilated Form BE. Available up to and including 3 hp at 1800 rpm, for applications requiring protection against dust, fumes, moisture.



DC DRIPPROOF

and dripproof-protected types Form F, in ratings to 7½ hp. Form H, 10 to 200 hp.

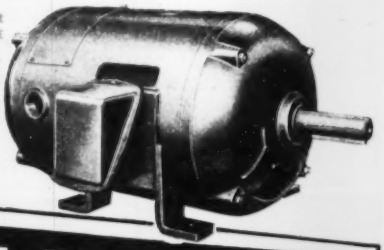


SQUIRREL-CAGE PROTECTED TYPE

Form BA. An open drip-proof motor for general purpose use. Available in wide modifications to meet a variety of conditions.

WOUND-ROTOR PROTECTED TYPE

Form BW. For slow, smooth acceleration, high starting torque with low starting current, or variable speed. Drip-proof, splash-proof, 1 to 200 hp.

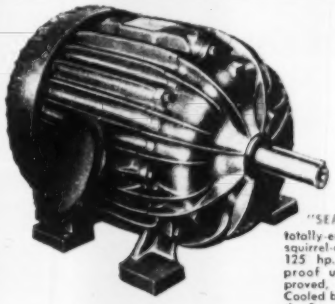


ELLIOTT COMPANY

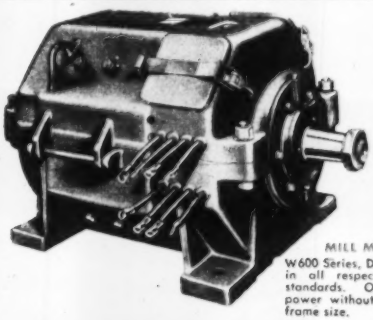
Other Elliott products include:
Turbine-Generators • Deaerating Heaters • Generators • Turbochargers • Strainers • Centrifugal Blowers • Condensers • Mechanical Drive Turbines • Steam Jet Ejectors and Tube Cleaners.

General Offices & Main Plant—Jeannette, Pa.

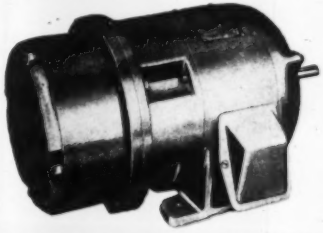
does the job better!



"SEALEDPOWER" totally-enclosed fan-cooled squirrel-cage motors, 3 to 125 hp. Also explosion-proof underwriter's-approved, 20 to 125 hp. Cooled by air blown along the finned outer case.



MILL MOTOR, W600 Series, DC. Conforms in all respects to AISE standards. Offers more power without increase in frame size.



BRAKE MOTOR using latest disk type brake mounted on BA drippproof motor. Also available with totally enclosed and splashproof enclosures for AC or DC applications.

Take your pick of these ELLIOTT CROCKER-WHEELER INTEGRAL MOTORS

from 1 to 200 hp

■ NAME YOUR POISON—is it dust, dirt, corrosive fumes, explosive hazard, water in fog, in drops, in a deluge—is it heavy duty, normal duty, limited motor space, high starting torque, etc., etc. Whatever the condition, an Elliott Crocker-Wheeler motor will prove itself the *right* one for the job—*right* not only because it is designed for the conditions of your drive, but also because it has behind it names that for many years have meant quality motor performance.

GET FULL INFORMATION about the C-W motor you need. Tell us your drive problems and we will be glad to send informative bulletins on the motors indicated.

NEED LARGER MOTORS? Looking for a really big motor—big in quality as well as capacity? You'll find it in the Elliott "Fabri-Steel" line, which employs the modern technique of electric welding in the achieving of greater strength, rigidity, lightness, and adaptability, with long life and easy maintenance. Bulletin on request.

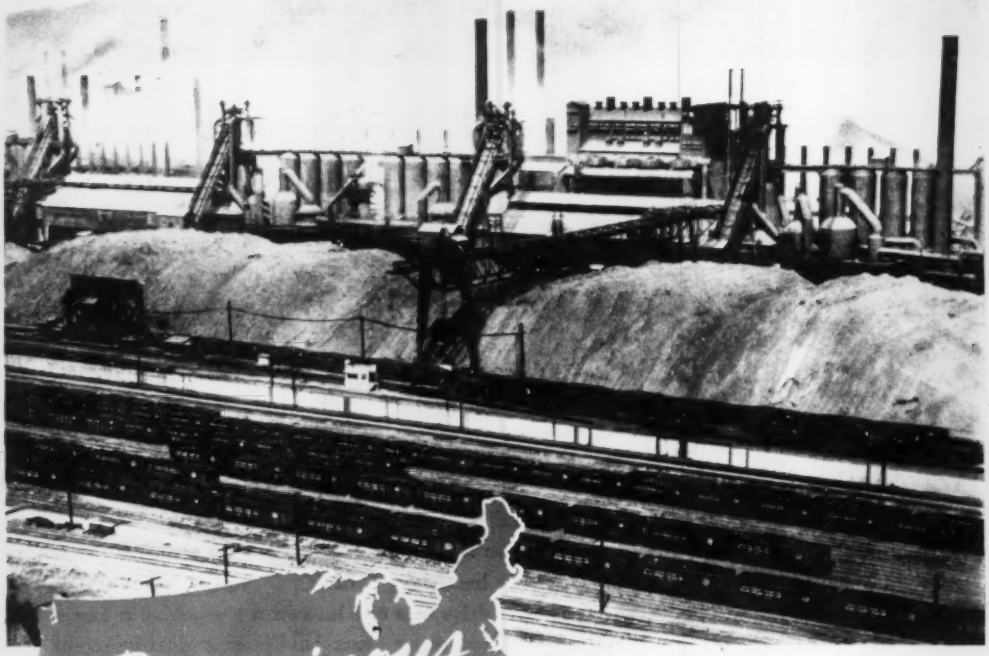
Address Your Request for Bulletin to
Dept. S, ELLIOTT COMPANY, JEANNETTE, PA.

CW-22

CROCKER-WHEELER DIVISION
AMPERE, N. J.

BRANCH OFFICES AND REPRESENTATIVES IN PRINCIPAL CITIES
ELLIOTT *Approved* SERVICE SHOPS COVER THE COUNTRY

1901 HALF CENTURY OF POWER PROGRESS 1951



Bituminous

is indispensable to the power of America

The bituminous coal industry
has the strength—the know-how—
to meet *any* challenge.

Only with indispensable bituminous
can the greatness of America be maintained.

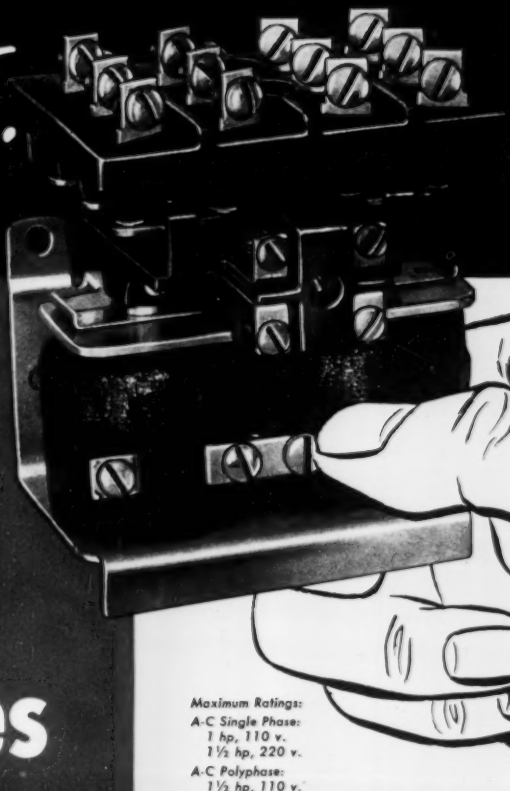
For excellent bituminous coals
to meet your every need,
Ask our man!

BALTIMORE & OHIO RAILROAD

Constantly *doing things* **— better!**

LINKING 13 GREAT STATES WITH THE NATION
B&O

New...



BULLETIN 705

STYLE A—A-C OR D-C

Reversing Switches

Here is a new, low cost, automatic reversing switch . . . extremely small in size . . . for small hoists, light monorail cranes, overhead doors, and other similar services.

Bulletin 705 Size A Reversing Switch in Type 1 Enclosure.

Bulletin 705 reversing switches consist of two mechanically interlocked solenoid contactors. Style A is for 2 wire control; Style B has auxiliary contacts for 3 wire control.

These small reversing switches have the same trouble free solenoid action and maintenance free contacts on which the reputation of other Allen-Bradley controls has been established.

Allen-Bradley Co.
1344 S. Second St., Milwaukee 4, Wis.

ALLEN-BRADLEY
QUALITY
MOTOR CONTROL

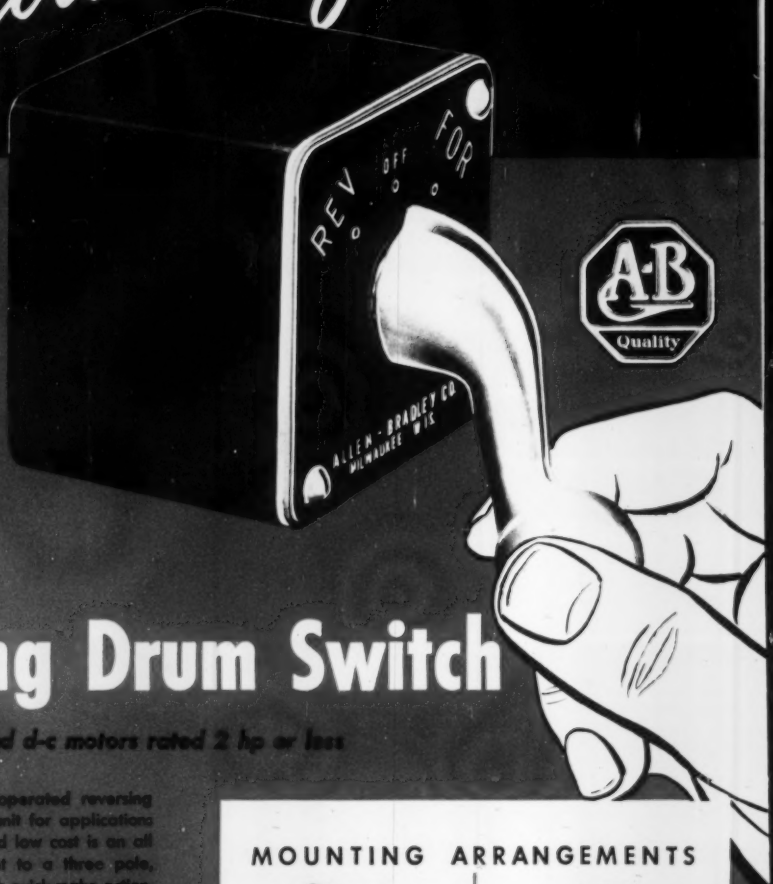
A-B Quality

Maximum Ratings:
A-C Single Phase:
1 hp, 110 v.
1½ hp, 220 v.
A-C Polyphase:
1½ hp, 110 v.
2 hp, 220-440-550 v.
D-C: ¾ hp, 115-230 v.

- **SMALL SIZE**
- **LOW COST**
- **SIMPLE SOLENOID MECHANISM**
- **DOUBLE BREAK SILVER ALLOY CONTACTS**
- **MECHANICAL INTERLOCK**
- **AUXILIARY CONTACTS FOR 3 WIRE CONTROL**

6-51-R

Announcing . . .



Bulletin 350
STYLE A
Compact
Low Cost

A-B Quality

Reversing Drum Switch

For a-c and d-c motors rated 2 hp or less

The new Bulletin 350 manually operated reversing drum switch provides a reliable unit for applications where space is at a premium and low cost is an all important factor. It is equivalent to a three pole, double throw switch equipped with quick make action. Contacts are cadmium silver alloy, eliminating the need for maintenance.

Bulletin 350 reversing switches are ideal for small workshop tools and for medium duty industrial service. They can be used with d-c motors, or single phase, two phase, or three phase a-c motors, rated two horsepower or less. Send for Bulletin 350.

Allen-Bradley Co.
1316 S. Second St., Milwaukee 4, Wis.

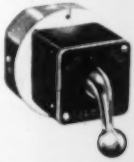
ALLEN-BRADLEY
QUALITY
MOTOR CONTROL

MOUNTING ARRANGEMENTS

With mounting angle and double conduit opening.

Drum switch mounted on standard square junction box.

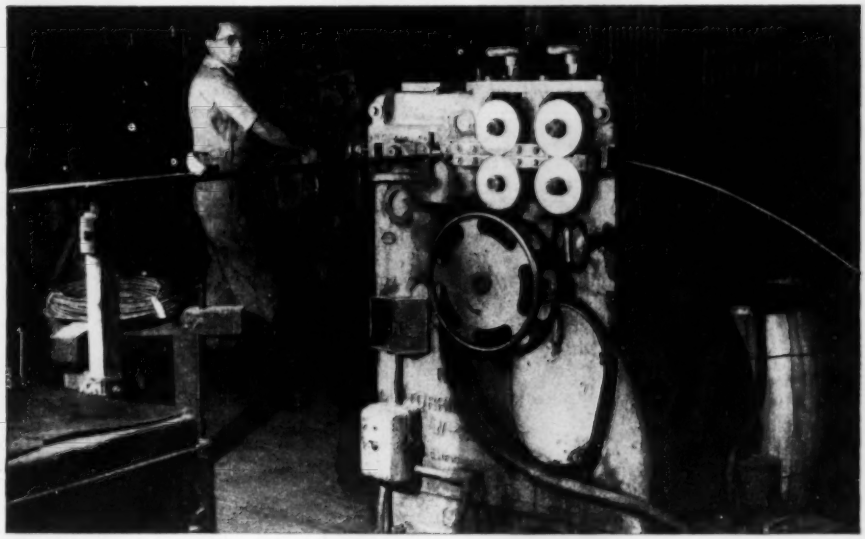
With cover plate for cavity mounting in machine base.



Switch mounted on standard octagonal junction box.

6-51-R

HIGH CARBON WIRE



Manufacturing control casing with Roebling wire.

Save money with Roebling wire

. . . round, flat and shaped

WHEREVER a manufactured product calls for high carbon steel wire, Roebling wire will bring you top results . . . and help your production, too! Every inch of these Roebling specialty wires is identical in grain, gauge and finish. Your preparation time is lowered; machine stoppages and rejects cut way down. And there's a Roebling round, flat or shaped wire for almost every application.

Roebling's specialty wire plant is one of the largest in America. Today a large share of its output is required in the rearmament program. We assure you, however, that we will always do our level best to fill your orders as required. John A. Roebling's Sons Company, Trenton 2, New Jersey.

ROEBLING

Atlanta, 934 Avon Ave • ***Boston,*** 51 Sleeper St • ***Chicago,*** 5525 W. Roosevelt Rd • ***Cincinnati,*** 3253 Fredonia Ave • ***Cleveland,*** 701 St. Clair Ave. N.E. • ***Denver,*** 4801 Jackson St • ***Detroit,*** 915 Fisher Building • ***Houston,*** 6216 Navigation Blvd • ***Los Angeles,*** 216 S. Alameda St • ***New York,*** 19 Rector St • ***Odessa, Texas,*** 1920 E. 2nd St • ***Philadelphia,*** 230 Vine St • ***San Francisco,*** 1740 17th St • ***Seattle,*** 900 1st Ave. S. • ***Tulsa,*** 321 N. Cheyenne St • Export Sales Office: ***Trenton, N. J.***

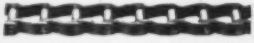
Why take it for granted?

We don't know the reason, but somehow chains seem to be taken for granted. If a chain for driving, timing or conveying has operated reasonably efficiently, that same chain is specified year after year. Yet, case after case shows that important savings can be made if these important functions are viewed with an eye for cost reduction and improved performance. For example:

• A manufacturer has been using a standard roller chain for years on his machine. A Rex Field Sales Engineer showed him that he could use a Baldwin-Rex Double Pitch Roller Chain and get the same operating efficiency at a substantial reduction in cost because speeds did not require standard roller chain.

• Another manufacturer had been using conventional flat top chain to carry cans through his machine. It was necessary to pay a premium for special bevel top plates to avoid tipping of cans. By switching to Rex Table Top® he got even smoother tip-free operation at far lower cost.

• In another instance, a Rex Field Sales Engineer persuaded a manufacturer to switch from the pin-and-cotter roller chain he was using to a Baldwin-Rex Riveted Roller Chain. The change not only resulted in an initial cost saving but in longer life since the rivets have greater holding power.

• To a manufacturer of construction machinery, who had been using cast manganese steel chains, a Rex Field Sales Engineer recommended the use of Rex Steel Chabelco Chains.  Since these chains are designed for efficient operation under dusty, dirty conditions, longer service life for both chains and sprockets at lower overall costs resulted.

Because Rex Field Sales Engineers have all the resources of a complete chain line at their command, they can recommend without prejudice the exact type or size of chain that will deliver the most efficient performance at the lowest cost to you and your customers. You'll find it will pay you to consult with him regarding your chain application problems. Call your nearest Field Sales Office, or write to Chain Belt Company—1660 W. Bruce Street, Milwaukee 4, Wisconsin.

Chain Belt COMPANY OF MILWAUKEE

REX

® BALDWIN REX

REX CHAIN & TRANSMISSION DIVISION
Milwaukee 4, Wisconsin

BALDWIN-DUCKWORTH DIVISION
Springfield 2, Massachusetts

MACK-HEMP

guideless rotary straighteners

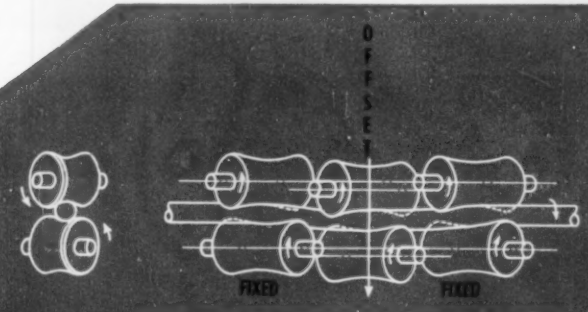
FOR

production-line straightening and finishing

OF

metal tubing and pipe

⅛" O. D. TO 15" O. D.



• The Mackintosh-Hemphill method of straightening is accomplished by an offset cross-roll pass between two fixed cross-roll passes (patented). No guides are required because the rolls are driven on both sides of the stock which is supported by the bottom rolls. With this balanced arrangement there is no decreasing efficiency from uneven wearing of the rolls. The straightening takes place from section to section and not from point to point.

These modern productioneering tools straighten and finish cut-length material such as stainless instrument tubing, aluminum aerial stock, copper fuel lines, aviation brake tubing, standard welded pipe, heavy-wall seamless alloy tubes, large diameter wrought-iron pipe, and many other ferrous and non-ferrous tubular products *in sizes ranging from ⅛" O.D. to 15" O.D.*

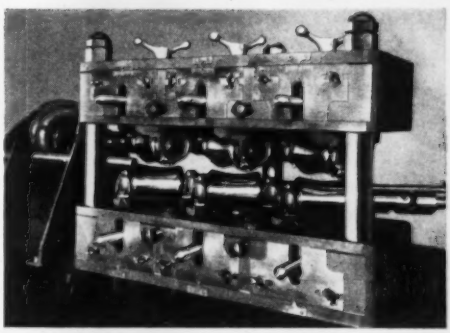
Mack-Hemp Rotary Straighteners employ a six-roll arrangement, basic in all sizes, which

- **STRAIGHTENS to precision tolerances, end-to-end**
- **FINISHES without leaving spiral scores, cuts, or rub marks on exterior surfaces**
- **REMOVES end bends from cut-length stock**
- **SPEEDS straightening and surface finishing operations**

Mackintosh-Hemphill Rotary Straighteners employ a patented roll arrangement with an offset cross-roll pass between two fixed cross-roll passes.

This feature eliminates supporting guides for the material and increases the productive life of the rolls.

Send for bulletin 2171-S which describes, in detail, the Mack-Hemp Rotary Straightener.

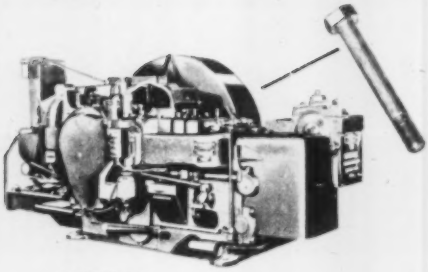


MACKINTOSH-HEMPHILL

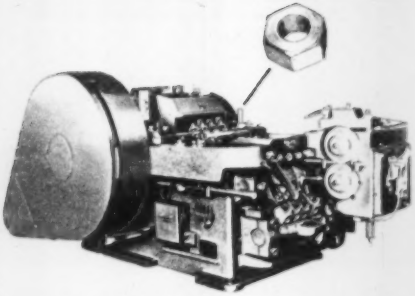
COMPANY

PITTSBURGH and MIDLAND, PENNSYLVANIA

MACKINTOSH-HEMPHILL PRODUCTS INCLUDE: **ROLLS . . . STEEL AND SPECIAL ALLOY CASTINGS . . . COMPLETELY INTEGRATED STRIP MILLS . . . HEAVY DUTY ENGINE LATHES . . . MACKINTOSH-HEMPHILL ROTARY STRAIGHTENERS . . . IMPROVED JOHNSTON PATENTED CORRUGATED CINDER POTS AND SLAG-HANDLING EQUIPMENT . . . SHAPE STRAIGHTENERS . . . END-THRUST BEARINGS . . . SHEARS . . . LEVELLERS**

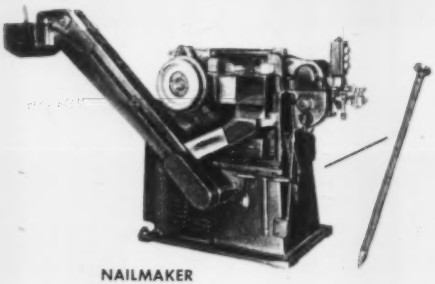


BOLTMAKER

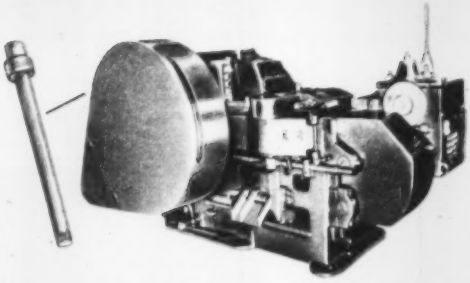


COLD NUT FORMER

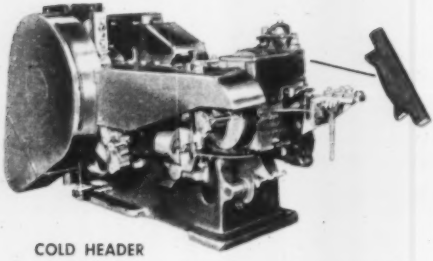
Our Job: HELPING YOU



NAILMAKER

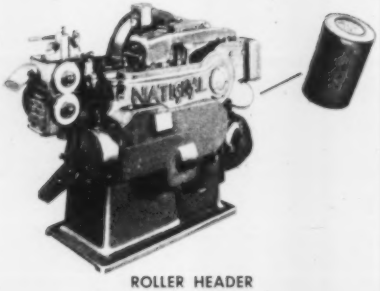


PROGRESSIVE HEADER

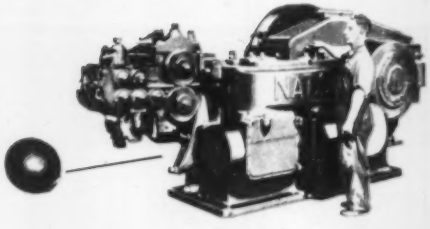


COLD HEADER

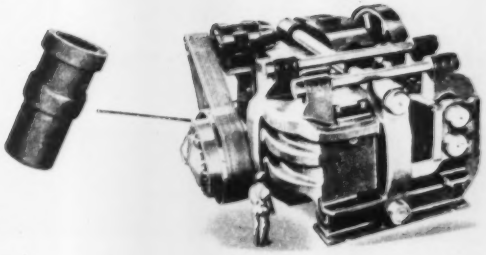
TUBULAR RIVET HEADER



ROLLER HEADER



BALL HEADER



FORGING MACHINE

"FLOW" METAL!

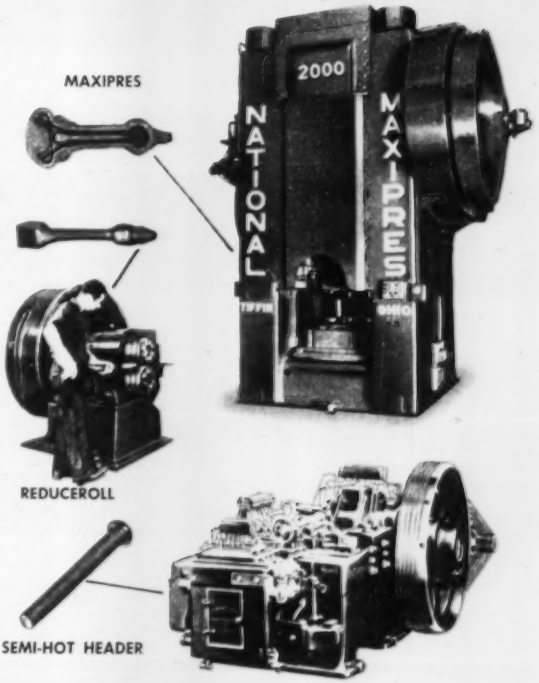
● Most people think of metal as an unyielding solid. To us it's fluid, even when cold. For 76 years our business has been the development of methods and machines which make metal *flow by pressure* into shapes required for the countless parts used in industry.

In peace and war, a growing share of the world's forgings, fasteners and other parts are being made on NATIONAL-built machines.

For example, large automobile crankshafts are finish-forged on a MAXIPRES weighing 1,600,000 pounds . . . five-penny nails stream from a NAILMAKER all day long 13 a second . . . ball-point pen balls, so small it takes 111,000 to make a pound, are made automatically from coiled wire on the smallest Cold Header.

NATIONAL'S all-around experience covers the full range of forging—hot and cold, large and small, ferrous and non-ferrous.

If you have a forging problem—hot or cold—or feel you might benefit by converting a certain part to a forging, why not have us take a look at it?



THIS DOOR IS ALWAYS OPEN

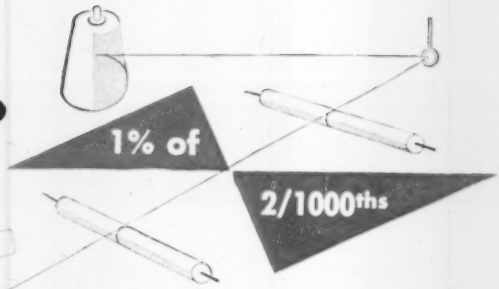
Send us a print or sample of your job. Better yet, pay us a visit. No obligation.

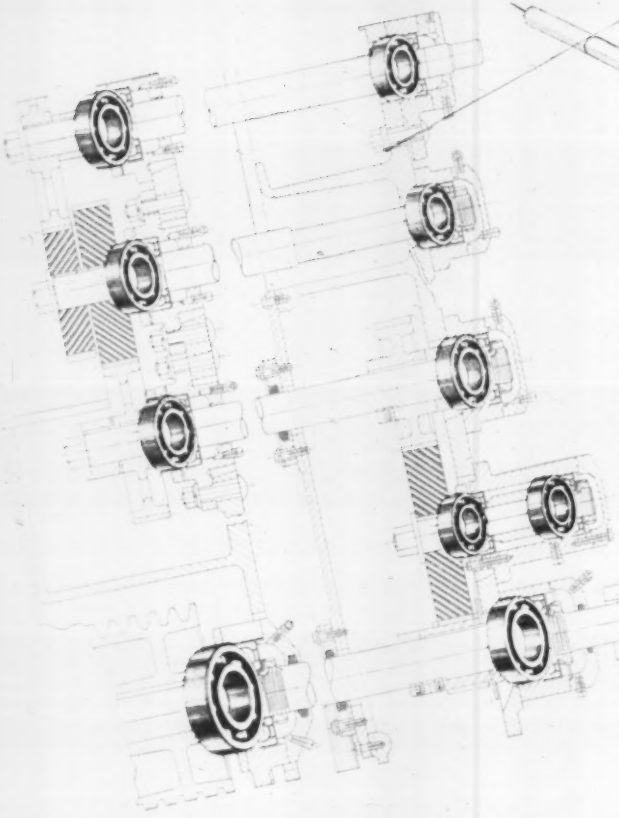
NATIONAL
MACHINERY COMPANY
TIFFIN, OHIO.

DESIGNERS AND BUILDERS OF MODERN FORGING MACHINES—MAXIPRESSES—COLD HEADERS—AND BOLT, NUT, RIVET, AND WIRE NAIL MACHINERY

Hartford Detroit Chicago

SETUP
that holds tolerance to





If you are familiar with machine designing, you'll consider this a "neat" piece of engineering. Such precision is actually achieved on mammoth synthetic thread twisters developed by Whitin Machine Works. The twisters stretch thread to a uniform .002 of an inch diameter and hold that diameter to within a 1% tolerance down a 40 foot line of spindles.

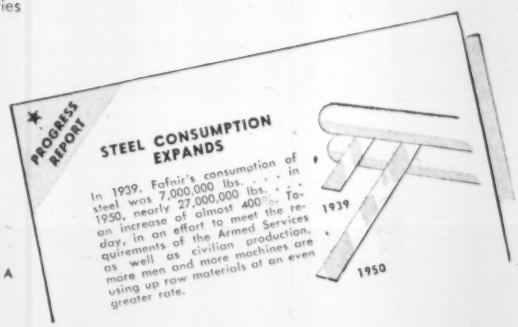
A sectional view of the head end which controls the "feed rolls" and "draw rolls" shows the Fafnir Ball Bearing setup that helps to keep their relative velocity absolutely constant . . . a "must" to produce such an amazing degree of accuracy. The Extra-Precision ball bearings used are made by highly trained operators on special equipment controlled by elaborate inspection devices.

Whatever your bearing problem, a few minutes spent with a Fafnir representative may help you solve it equally as successfully. Fafnir's experience is not limited to just a few industries . . . it's industry-wide. The Fafnir Bearing Company, New Britain, Conn.

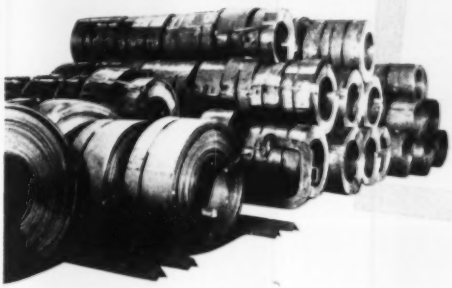
Bearings used
Fafnir Extra-Precision Ball Bearings of the 200 (Light) and 300 (Medium) Series are shown in the ten locations above.

FAFNIR
BALL BEARINGS

MOST COMPLETE LINE IN AMERICA


PROGRESS REPORT
STEEL CONSUMPTION EXPANDS
In 1939, Fafnir's consumption of steel was 7,000,000 lbs. . . . In 1950, nearly 27,000,000 lbs. . . . an increase of almost 400%. Today, in an effort to meet the requirements of the Armed Services as well as civilian production, more men and more machines are using up raw materials at an even greater rate.
1939
1950

QUICKER DELIVERIES, LOWER COST OF *Coiled Strip*



"Since we installed the Yoder Slitter, we have had very little trouble in obtaining deliveries of coiled strip sufficient for our needs."

"We can now buy available mill-widths almost anywhere, instead of being confined to those relatively few sources able to supply special widths."

"Since it is no longer necessary for us to keep in stock a larger number of special widths, our inventories have been cut in half or better. As long as we have on hand the proper gauges, we can slit as needed to the exact widths required . . . ."

The above, in effect, is the common experience of fabricators and warehouse operators who have installed Yoder slitters for coils and sheets. In addition, there is a saving of anywhere from $5.00 up to $100.00 or more per ton in the purchase price of coiled strip. A Yoder Slitter may, therefore, be highly profitable for requirements as low as 1000 tons per year, more or less, depending on widths and gauges required.

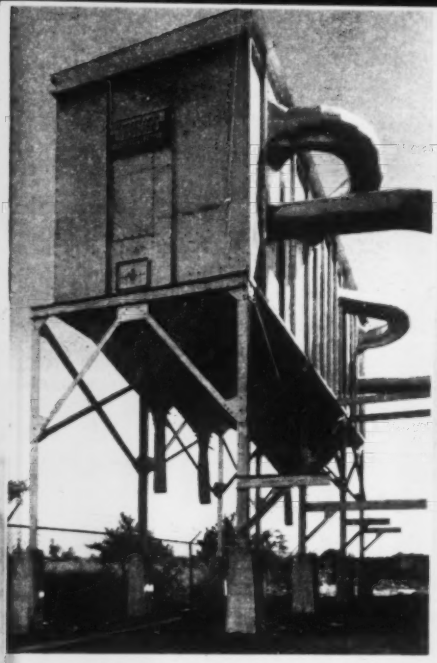
Send for 76-page book on the economics as well as the mechanics of doing your own slitting. Consultations, recommendations, estimates without cost or obligation.

THE YODER COMPANY • 5502 Walworth Ave., Cleveland 2, Ohio

Complete Production Lines

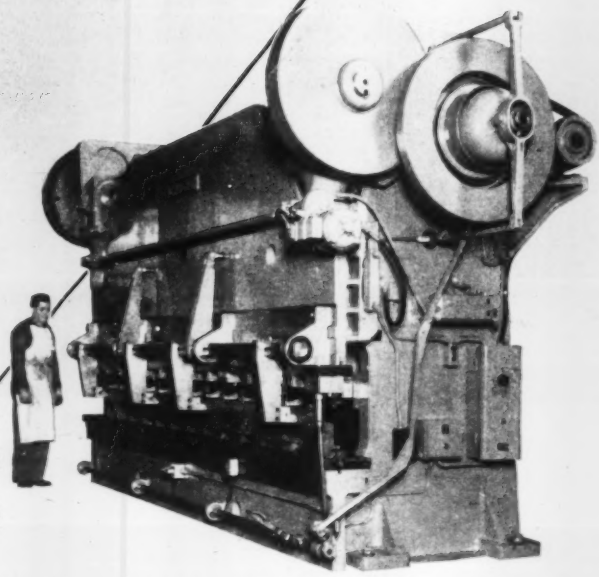
- ★ COLD-ROLL-FORMING and auxiliary machinery
- ★ GANG SLITTING LINES for Coils and Sheets
- ★ PIPE and TUBE MILLS–cold forming and welding

ENGINEERING YODER MANUFACTURING



The American Dustube Dust Collector
Photo Courtesy American Wheelabrator and Equipment Corp., Mishawaka, Indiana.

saved 45 minutes every hour!



"American Wheelabrator" says:

Punching Support Angle

OLD METHOD:

Layout time—three hours to layout 12 holes in each 50 angles.

Punching time—25 pieces an hour total punching time, 2 hours for the 50 pieces.

Total time—5.0 hrs.

CINCINNATI METHOD:

Layout time—none.

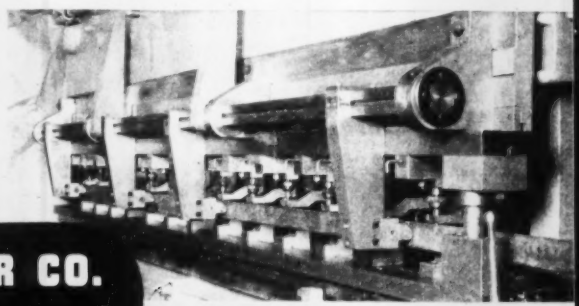
Punching time—1 1-10 hours to punch 50 pieces.

Total time—1.1 hrs.

Substantial cost reductions per piece have been effected in the punching of structural channels ranging from 3" to 8", and angles up to 5" x 5" on this 120 Series 12' Cincinnati All-Steel Press Brake. This entire range of work is handled with two sets of quickly interchangeable punching blocks.

Location and spacing of holes are maintained accurately throughout all operations with substantial reduction in subsequent assembly costs.

If you punch, form or bend, write our Engineering Department. They will gladly cooperate in lowering the cost per piece in your shop.



Pneumatic clamps automatically hold the work accurately in position. The adjustable center punching blocks give many combinations of spacing and number of holes.

CINCINNATI

Write for Press Brake Catalog B2A

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO U.S.A.

SHAPERS · SHEARS · BRAKES

STEEL

The Metalworking Outlook

October 1, 1951

Time Is Now

Today is the day. Oct. 1, 1951, is more than the beginning of the fourth quarter; it's the day when all steel, copper and aluminum goes under CMP; it will probably be the day that future historians will pick as the beginning of full-scale economic mobilization. In this quarter, some of the final blows will be dealt to hammer the economy into an instrument producing many guns and some butter. That instrument, with some modifications, is certain to last for many months, perhaps even years.

Capital Expenditures Soar

One characteristic of that economic instrument, for the next two years to come at least, will be capital expansion (p. 35). Expenditures on new plant and equipment will probably exceed $24 billion a year in 1951, 1952 and 1953. A sample of what's being planned is Westinghouse Electric Corp.'s $296 million program extending beyond 1953.

Room for Cutting

Outlays for national defense are now accounting for about 9 per cent of the gross national product. It's still far below the wartime high, when it hit 41.5 per cent. Other government expenditures have fallen from about 12 per cent of GNP in 1949 to less than 9 per cent now. During World War II, other government spending touched a low point of 3.2 per cent in 1945. In that last figure is an indication that non-defense government spending can be cut far more than it has been.

Word to the Wise

It's wise to make tentative plans on how you're going to insure yourself against war damage. Congress is studying war damage legislation that would set up some sort of government insurance, but a supplemental private insurance program might also fit into the picture. One factor which led toward nationalization of industry in Europe after World War II was the total reliance by most companies on government help to rebuild.

Not Serious: Steel Black Market

The black market in steel is thus far minor, far less serious than it was in the 1946-1948 period. CMP makes it more difficult for tonnages to slip into opportunists' hands, and buyers aren't as tempted to pay the high prices because they're short of other materials that are even harder to obtain, notably copper and nickel. Testimony turned up at Senate Small Business Committee hearings indicates that the black market in nickel is becoming serious. It's selling for about $4.50 a pound, more than six times the normal market value.

Troubles in Scrap

The iron and steel scrap drive isn't doing too well. Unless there's improvement soon, watch for a program of World War II proportions

Production-Engineering News—p. 63 The Market Outlook—p. 139

to bring in the material. Scrap piles on hand at consumers' plants averaged 1.2 months on July 1, but rose to only 1.4 months on Sept. 1 despite two months of effort to get more of the iron and steel waste. Ohio valley scrap users are in the worst shape; their inventories average only 10 days. Only bright spot in collections is increasing receipts of auto wrecker scrap which may reach 3.9 million gross tons this year, 30 per cent more than in 1950.

Changes in CMP?

Steel Products Industry Advisory Committee meets today, Oct. 1. From that meeting may come important decisions on what can be done to help CMP ticket holders who haven't been able to cash in their fourth-quarter steel tickets. The committee will consider the proposal to modify the directive which permits steel mills to accept tonnages first from historical customers. Its advice will also be sought on a directive that would clear the order books from one quarter to another. That means that any CMP tonnages not filled at or near the end of one quarter would be automatically canceled. Both those proposals are being suggested to get the CMP situation in steel straightened out.

Checklist for Foremen

Are your plant foremen doing their jobs? E. S. Howard of Minnesota Mining & Mfg. Co. says the eight major tasks to be performed by shift foremen are: Work distribution, job instruction, work simplification, human relations, getting new employees off to the right start, directing technical assistants, making necessary reports, receiving instructions.

Straws in the Wind

Operation of the Air Force manufacturing methods pilot plant at Adrian, Mich., is being turned over to Bohn Aluminum & Brass Corp., Detroit, the wartime operator . . . Salary Stabilization Board has issued a new regulation permitting employers flexibility in making salary adjustments for individual employees . . . Danly Machine Specialties Inc., Chicago, is manufacturing a new line of hydraulic metalworking equipment originally patented by Mueller Engineering Co., Dearborn, Mich.; typical operations are the simultaneous piercing of all holes and the trimming of automotive frame members . . . Atomic Energy Commission has named Union Carbide & Carbon Corp., operator of the Oak Ridge facilities, as operator of the new uranium-235 production plant at Paducah, Ky. . . . Central Military Procurement Information office of the Munitions Board has moved back to its old quarters, room 3D754, Pentagon.

What Industry Is Doing

New steel facilities will be useless unless we get more pig iron and coke capacity (p. 35) . . . Expansion geography: Heaviest capital expenditures are in Pennsylvania, Texas, Ohio (p. 36) . . . There has been no machine tool giveaway; they were leased (p. 37) . . . Canada's industrial frontier: British Columbia (p. 38) . . . Boron steel passes the test (p. 39) . . . High volume of aircraft and ordnance orders are changing some company-geographical area leaders in arms contracts (p. 41).

This is another of the "HUNDREDS OF JOBS" which can be done on a MARVEL Band Saw!

MARVEL BAND SAW saved these two 4400 lb. castings

Two sand cores washed out when these giant 4400 pound steel connecting rods were cast, resulting in solid eye ends without gaps. Then came the $64 question—how to machine out the 1½" slots in the longitudinal center of the eyes which were 22" high and had a wall thickness of 6½".

The Ernest J. Nelson Iron Works of San Francisco, did this "impossible" job easily, quickly, and economically, without special tooling, on a standard Model #8M/2 MARVEL Band Saw. Two cuts were made in each rod in two hours per cut with tool cost of $3.06 per rod. The tool was a MARVEL B9-10 Band Saw Blade.

Every tool room, machine shop and maintenance department needs a MARVEL Series 8 Universal Band Saw—not only for innumerable everyday jobs but for the occasional "trick" operations, where its utmost versatility will save many headaches and dollars.

WRITE FOR CATALOG

Metal Cutting MARVEL SAWS

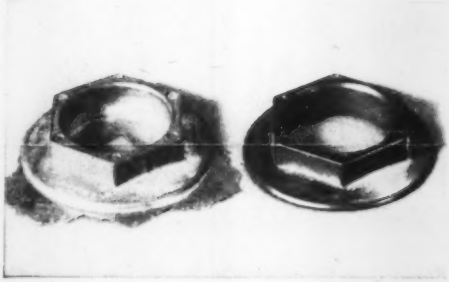
These exclusive MARVEL Features made this job easy.

1. Large, T-slotted work table.
2. Blade feeds into work vertically; work always stationary.
3. Power-pressure feed.
4. Automatic Blade tension.
5. Built-in coolant system.
6. Large capacity.

ARMSTRONG-BLUM MFG. CO.

5700 BLOOMINGDALE AVENUE **CHICAGO 39, ILLINOIS**

What Does Barrel-Finishing With ALUNDUM* TUMBLING ABRASIVE Offer You?



Typical die casting before and after tumbling with ALUNDUM Tumbling Abrasive.

A variety of parts before and after barrel-finishing with ALUNDUM Tumbling Abrasive. Included are castings, forgings, stampings, and machined parts.

- It provides you with a fast, clean, economical method for finishing your metal parts to exact dimensions and degrees of surface finish.

- It enables you to remove burrs, flash, tool marks, and heat scale from large quantities of stampings, die castings, and forgings quickly and inexpensively.

- It eliminates many slow hand-finishing operations, increases production, saves time and money.

- If you don't have barrel-finishing equipment in your plant, Norton will make test runs for you, without obligation, to show you what this process with ALUNDUM Tumbling Abrasive can do for you.

A Tip on Barrel-Finishing

Don't forget that oily parts should be thoroughly cleaned before barrel-finishing. They retard the abrasive action and make it impossible to obtain bright finishes.

Norton Booklet, Form 301, "Precision Tumbling with Alundum Abrasive" is packed with useful information. Write for your free copy.

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ABRASIVES
Making better products to make other products better

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Competitive Capitalism

One of the difficulties encountered in "selling" the idea that capitalism is superior to socialism, communism, Stalinism and some other "isms" is that people in many lands are confused as to what capitalism really is.

In England and on the continent of Europe many people judge the capitalistic system on the basis of what they know about private enterprise in their own localities. In many cases, the examples which come within their view are businesses which are conducted in the enviroament of cartels or other devices by which keen competition has been circumvented, mediocre management tolerated, mechanization neglected and proper wage remuneration opposed. In other words, they have witnessed companies in which management assumes a negative attitude toward practically everything that contributes to the type of progress which is necessary to achieve the constructive objective of "more goods for more people at lower cost."

This concept is so radically different from that of free enterprise developed under capitalism in the United States that much more attention should be devoted to explaining the difference. If more people in Britain, in Europe and in some other parts of the world could be made to see and understand clearly how our system differs from their concept and how it works, many of our international misunderstandings could be lessened or dissolved.

One feature which makes our brand of capitalism distinctive is competition. In many of our greatest industries—ferrous and nonferrous metal producing, automobile, electrical manufacturing, machinery, petroleum, chemical, etc.—there are numerous companies all engaged in keen competition with their contemporaries not only to win and hold their share of the market but to expand the market. Due to this competition and to other factors, prices, wages, working conditions, productivity and numerous other elements of production, sales and distribution combine to create a result whereby tens of millions of consumers are able to buy and use as commonplace essentials of life articles and goods which under the non-competitive capitalistic systems are "luxuries" to be enjoyed only by the wealthy.

More effort should be made to explain these great advantages of competitive capitalism.

E. L. Shaner

EDITOR-IN-CHIEF

SHOWS PEAK CAPACITY: American Iron & Steel Institute's new directory of iron and steelworks, showing facilities as of Jan. 1, 1951, reveals the marked changes that have occurred since the last directory was issued in 1948. Total capacities at the beginning of 1951 were: Pig iron and ferroalloys, 72,553,460 net tons; coke, 66,784,640 net tons; steel

ingots and castings, 104,502,680 net tons; and finished hot-rolled products, 83,699,890 net tons.

All of these capacities represent new peaks in the industry's history. Even more important is the fact that considerable new construction is underway which will bring the totals to substantially higher levels in 1952 and 1953.

Behind the cold statistics are numerous examples of significant progress. For instance in 1926 there were 395 blast furnaces having an average annual capacity of 145,034 tons per stack. On Jan. 1, 1951, there were only 250 furnaces but their average annual capacity was 290,214 tons per furnace. This and other interesting comparisons make the summary of the institute's latest directory interesting reading for producers and consumers alike. —pp. 121-136

BASIS FOR OPTIMISM: If during recent weeks you have noticed considerable emphasis by economists upon the likelihood of a good volume of business over the next year or two, the chances are that this optimism is based upon indications of continued heavy expenditures for new plant and equipment. Right now the experts are calculating that the total earmarked for these purposes will be $24.8 billion in 1951 and perhaps $24 billion a year in 1952 and 1953.

These figures are not to be taken lightly. The expenditure estimated for the current year represents almost one-eighth of all of the business transacted in the United States in that period. The only qualification to be considered is that shortage of materials may either slow or cut down the schedule of new construction. This shortage is complicated by the threat of unbalanced expansion. Some authorities fear that expansion of blast furnace and coke oven facilities will not keep pace with extension of steelmaking capacity. —p. 35

EXTEND LIFE 50 YEARS: Decision of Reserve Mining Co. to proceed immediately with construction of a 2.5-million-ton-per-year beneficiating plant at Beaver Bay, Minn., to produce commercial high-grade iron ore from magnetic taconite brings nearer to reality the dream of utilizing the vast reserves of low grade ore in the Lake Superior regions.

Converting these taconite reserves into commercial substitutes for high grade ore will be an important achievement. One expert estimates that the taconite in one Lake Superior ore range alone represents a potential of 2000 million tons of 63 per cent iron concentrates. This is equivalent to 2500 million tons of the 50 per cent iron lake ores of the past and present and would extend the life of the lake ore region 50 years.

—pp. 37, 88

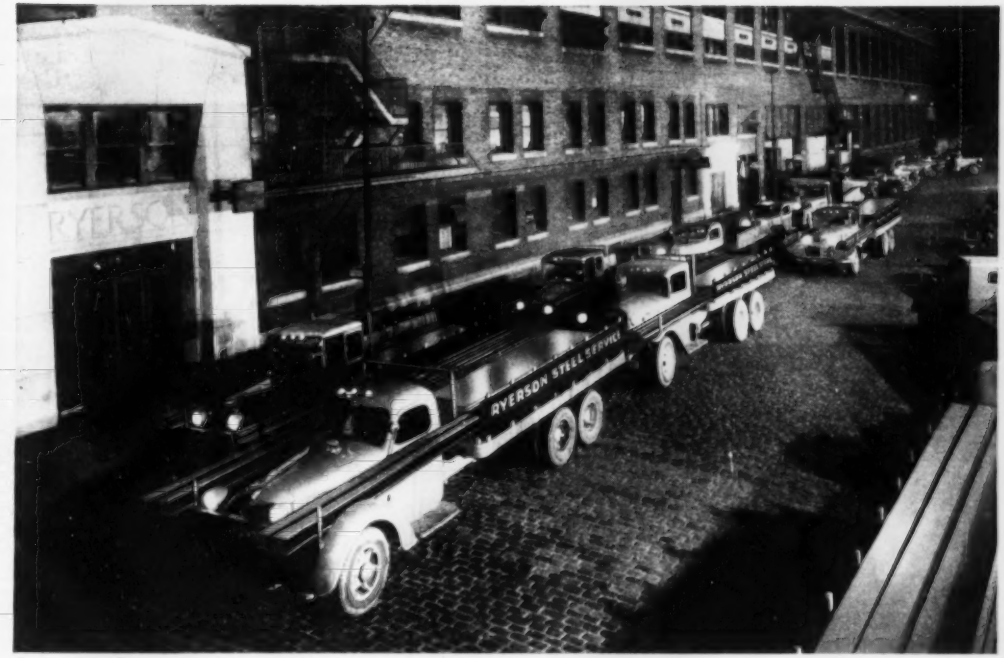
INGENUITY PAYS WELL: Persons who are observant of developments in fabricating practice constantly are impressed by evidence of how comparatively simple changes in methods sometimes lead to substantial savings in costs. In a western plant, two men working together were assembling one 8 x 8-foot all-aluminum door every 55 minutes or nine doors per 8-hour shift. Engineers worked out a new method of assembly by which one man turns out one door every 45 minutes or 12 per 8-hour shift.

This appreciable saving in time and cost was accomplished by introducing a power-operated table and installing a metal stitcher which had been rebuilt with an extended throat and other refinements to accommodate this particular job. Possibilities for this kind of application of power and positioning aids to assembly work are almost unlimited in many metalworking shops.

—p. 74

CAN REDUCE RUST LOSS: For many years personnel of the metalworking industry has taken it for granted that a certain amount of waste will result from the rusting or corrosion of ferrous raw materials, fabricated parts and finished products. There will continue to be severe losses from these causes but their volume can be reduced to a marked extent by proper use of the increasing number of methods of preventing or controlling rust and corrosion.

Four general types of rust preventives are available—solvent-dispersal coatings, hot dip compounds, rust-inhibiting oils and the volatile, chemical treated papers. The last named is the newest technique. It consists of wrapping or shrouding metal in special paper which has been impregnated with a volatile chemical inhibitor. Under humid conditions a rust inhibiting vapor is given off by the paper which permeates the air of the package and prevents moisture from causing rust. —p. 81



Working Late... To Ship Steel Early

Here are Ryerson trucks all loaded by the night shift and ready to be on their way to our customers—early in the morning. This "after-hours" operation is typical of the way we work at Ryerson to speed up your steel deliveries.

Every kind of steel is on hand for quick shipment at your nearby Ryerson Plant. Though stocks are currently out of balance due to ever-increasing defense needs and unprecedented civilian demand, we are still able to serve you.

Your Ryerson representative has specific answers to your questions involving the purchase, application or fabrication of steel. He is fully posted, for instance, on the new alloys and on practical substitutes for hard-to-get steels. So, for any kind of steel—for complete steel service—call your nearest Ryerson Plant.

PRINCIPAL PRODUCTS

CARBON STEEL BARS—Hot rolled and cold finished
STRUCTURALS—Channels, angles, beams, etc.
PLATES—Many types including Inland 4-Way Safety Plate
SHEETS—Hot and cold rolled, many types and coatings
TUBING—Seamless and welded, mechanical and boiler tubes
ALLOYS—Hot rolled, cold finished, heat treated. Also tool steel
STAINLESS—Stainless bars, plates, sheets, tubes, etc.
BABBITT—Five types, also Ryertex plastic bearings
MACHINERY & TOOLS—For metal fabrication

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CINCINNATI • CLEVELAND
DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO

"Those blanks aren't scrap... they're saleable steel", agreed Norm

Waste is something Norm can't stand. The same goes for Tom Brinker, manufacturer of portable welding units and a long-time Inland customer. "Every time you form a lamination for your welder," Norm observed, "you leave a 4 x 7 inch piece of 22 gauge electrical sheet steel that you can't use. Why not let us find you a customer for those blanks?"

Norman Grant is an Inland Steel sales representative. His experience told him that those 4" x 7" blanks had more than scrap value. Especially at a time when steel is in such great demand. With his trade contacts, Norm was sure he could find a buyer.

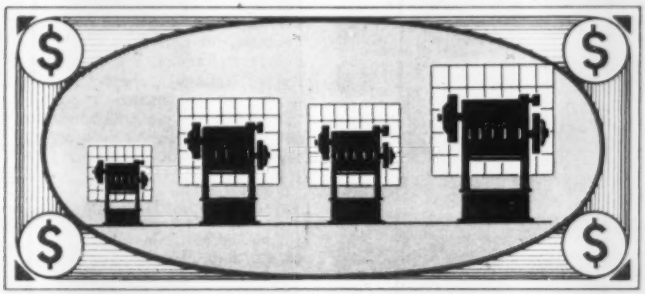
A few days later, on his way to visit another Inland customer, Norm had almost driven past the plant of an outboard motor manufacturer when he got a flash . . . "motors!" He stopped. Sure enough, that manufacturer had a pressing need for steel for his magnetos . . . and 4" x 7" was a perfect size.

Result: An Inland customer's profit was augmented by the sale of otherwise waste blanks and a motor manufacturer got steel he sorely needed. INLAND STEEL COMPANY, 38 South Dearborn Street, Chicago 3, Illinois.

Your scrap is needed by the steel industry for national defense.

Names used are fictitious.

Making your steel is only part of our job.



1946 $12,040 Million | 1948 $19,230 Million | 1950 $18,560 Million | 1951 $24,830 Million

Capital Outlays Buttress Economy

Peak expenditures for new plant and equipment of $24.8 billion in 1951 and at least $24 billion annually for the next two years assure high economic activity

ONE BULWARK promises to keep the economy riding high through 1953 at least—no matter what the weaknesses in other economic buttresses, notably consumer and military spending.

Expenditures for new plant and equipment will reach a sensational high of $24.8 billion in 1951 and will continue at or near those levels through 1953. That's virtually assured because most of the contracts have been let, the materials earmarked. No such assurances are present for consumer spending. It has been in the doldrums for months. Although a mild upturn is now showing up, indications are that the super-spending by consumers from 1946 through early 1951 is over. Chances are that military spending will increase or at least hold steady through 1953 but those chances are subject to the vagaries of politics and the military situation.

Rock of Gibraltar—So, if you can place your confidence in any economic supports over the next two years, you can rely on capital expenditures. Even if the government clamps down tighter on construction, the important expenditures on new equipment will still hold. Thus far, construction curbs have not made much of a dent in capital expenditures. In the fourth quarter of this year, when the present restrictions will be fully felt, the Department of Commerce and the Securities & Exchange Commission estimate that the outlay will be $6.6 billion, well above the $5.2 billion in the first quarter and $6.3 billion in the second, committed when no curbs were in force. The fourth quarter sum is below only that for the third quarter when an estimated $6.8 billion was spent.

The government estimate of $24.8 billion on capital expenditures in 1951 is by far an alltime high (see chart). Even allowing for about a 10 per cent inflation since 1948, it is comfortably above the previous peak, set in that year. The segment of the economy this year, as in all other years, that accounts for most of the capital outlay is manufacturing, but in 1951 it is expanding more than usual. Its $12.8 billion expenditures will account for 51 per cent of total capital improvements, in contrast to 39 per cent in 1948 and similar ratios in other years. The 1951 pattern promises to hold in 1952 and 1953 when at least $24 billion will be spent on new plant and equipment each year. Capital expenditures may drop to about $21 billion in 1954 and to $18 or $19 billion in 1955.

Big Slice—Nearly one-eighth of all business transacted in the U.S. this year will result from expansion of industrial facilities. If the programs for the second half of this year are realized, capital outlays will be about two-thirds higher than in the six months before the outbreak of the Korean war. For all quarters of 1951, the larger firms show larger relative increases in capital expenditures than do the smaller ones. Currently, only the largest size group is anticipating an increased rate of fixed investment from the third to the fourth quarter.

Materials shortages are the greatest threat to continued high capital expenditures. They explain why this year's fourth-quarter estimates are below those for the third. But thus far government allocations have been relatively generous for most capital equipment needs and many construction requirements. That policy should continue, for equipment at least, over the next two years.

Spending Well Balanced?

Full use of expanded steel facilities won't be possible till we get more pig iron, coke capacity

THE CAPITAL expenditures program is large, but is it well balanced?

In the case of iron and steel expansion, there's trouble ahead. That was the theme last Thursday when Defense Production Administration officials and Defense Mobilizer Charles E. Wilson met with steel company executives.

Pig Iron, Coke—Two serious deficits are indicated in the iron and steel expansion program as it now stands—one in pig iron and the other in coke. Unless much more tonnage of these materials than now promised is made available, it will not be possible to get full production from the new steelmaking and casting facilities now in the works. To prevent such a contretemps some sort of remedial action will have to be taken soon.

The expansion program calls for the following approximate total capacities by the middle or end of 1953: Pig iron and ferromanganese 82 million net tons; steel ingots 118 million net tons; steel castings 3 million net tons; gray iron castings 16.5 million net tons; malleable castings 1.5 million net tons. For complete steel industry statistics as of Jan. 1, 1951, see the special section beginning on p. 121.

Deficits—To bring pig iron ferromanganese production in line with the scheduled requirements for ingots and castings, informed authorities hold that blast furnace capacity by the end of 1953 must be in the neighborhood of 88 million net tons instead of the presently scheduled 82 million. As to coke, they figure a

deficit of well over 1 million net tons for 82 million tons of blast furnace capacity, with the deficit rising to 6 million tons for 88 million net tons of pig iron and ferromanganese.

The deficit figures, of course, cannot be computed accurately. For instance, it is estimated that ferrous scrap will be available in 1953 and 1954 at a rate of between 19 and 20 million net tons annually; if scrap collections should be larger, the need for pig iron would be less. Again, output of old blast furnaces can be increased by charging improved raw materials, and by applying technological improvements also by enlargement at time of relining. But, even allowing for these factors, the above estimate of the mid-1953 pig iron deficit is not regarded as being far out of the way. There also are factors of uncertainty in connection with coke. It is possible that coke production may be only around 90 per cent of the rated capacity; on the other hand, it could be 100 per cent. Again, more than 40 per cent of the existing slot-type ovens are more than 25 years old, and how much longer they can work without being replaced is a question. Considering all the circumstances, the coke deficit estimate given above probably is not far off the target.

Ingot Mold Maker May Expand

Expansion in the iron and steel industry continues to touch off plans for expansion in related industries.

One of the latest moves concerns Vulcan Mold & Iron Co., Latrobe, Pa. It purchased a 30-acre tract north of Riverside, N. J., for location of an ingot mold foundry it is considering.

James M. Underwood, president of Vulcan, noted that expansion of existing steel mills coupled with new construction would tax ingot mold suppliers to service expanded requirements.

Currently, the company is completing a new ingot mold foundry at Lansing, Ill.

First Fairless Unit: On Time

Despite government restrictions on usage of structural steel, the first unit at U. S. Steel Co.'s Fairless Works being built at Morrisville, Pa., will go into operation on schedule, reports to STEEL would indicate.

That first unit would be the tin plate mill, and operations would start probably around Jan. 1.

Shortly after that date, the cold-rolled sheet mill would go into operation on schedule. STEEL also learned that no delay is anticipated in blast furnace construction at the Fairless Works.

Modest delays, however, will be experienced in construction of the blooming, slab, billet, bar and hot strip mills, and also in the schedule for the National Tube Co.'s facilities at the Fairless Works.

None of the open hearths likely will go into operation until after the semifinishing mills are ready.

DON'T GO BOOM: These practice-type 3.5 inch bazooka rockets, similar to those used in Korea as anti-tank protection, are being manufactured by Ford Motor Co., at its Highland Park, Mich., plant for U. S. Army Ordnance. Rows of warheads at left and rocket bodies at right represent less than 15 minutes' production output

BAKE UNTIL RUBBER: Covers for 100-pound grease drums get squirted with a rubber compound on the machine at U.S. Steel Products Co.'s Beaumont, Tex., plant. Cover and compound are then oven baked for one hour and a half, the compound becoming a sponge rubber gasket which serves as an air-tight seal between cover and drum when it is filled. John E. Pearce, operating the machine, has lined 6 million or more covers in this way over a period of 12 years

Interlake Spends to Improve

Another $14 million is being added to its improvement and expansion program as Interlake Iron Corp., Cleveland, flexes its muscles to meet growing demands for pig iron. Interlake's annual rated capacity for producing pig iron will jump 23 per cent, from 1,320,000 net tons at the beginning of 1951 to 1,620,000 net tons, as a result of these new expenditures.

This new commitment raises the total cost of Interlake's overall improvement program to $34 million.

Included in the plans are modernizing and enlarging blast furnaces at Toledo, Chicago, and Erie, relining and improving the second Chicago furnace, enlarging the Chicago ore receiving dock and adding two new storage bridges, constructing an ammonium sulphate plant at Chicago, and constructing a road tar distillation plant at Toledo.

Geography of Expansion

Based on necessity certificates, capital expenditures are heaviest in Pennsylvania, Texas

WHAT areas are getting the bulk of American industry's capital expansion?

Although certificates of necessity granted by the government for fast tax amortization of defense jobs cover only part of the expansion, they are sign posts for the geographical distribution of all new plant and equipment programs because most projects are now defense-related. More certificates of necessity have been issued to Ohio industries as of Aug. 18 than to companies in any other state.

Certificates granted to Pennsylvania projects had the highest dollar valuation.

Where It Goes—A geographic analysis of 3328 projects, approved as of Aug. 18, shows that 328 went to Ohio companies on projects aggregating $672,326,000. Pennsylvania firms were awarded 307 certificates on projects totaling $1,125,615,000, while 287

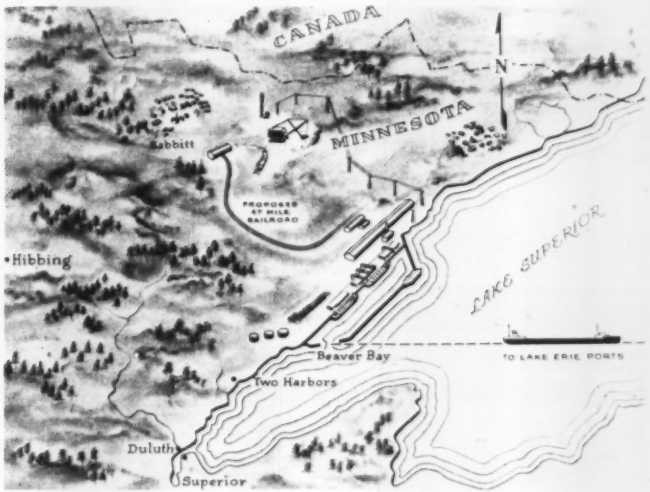
went to California industries on projects totaling $313,847,000.

Pennsylvania Leads in Dollars — Pennsylvania's projects had the highest dollar value, and Texas, which received only 140 certificates, was second in dollar value with $825,595,000.

On a sectional basis, the East North Central states (Ohio, Indiana, Illinois, Michigan and Wisconsin) led the country in the number—881—and dollar value—$1,867,755,000—of proposed investment expansion certificates. The Middle Atlantic states (New York, New Jersey and Pennsylvania) were second with 643 certificates on projects totaling $1,600,979,000, while the West South Central states (Arkansas, Louisiana, Oklahoma and Texas) were third, received 205 certificates on projects costing $1,152,032,000.

The Brakes Are On—Aug. 18 is taken as the terminal date for geographic analysis of certificates because then the government partially froze defense expansion tax approvals for 60 days. Special projects can still be approved, but only 24 were O.K.'d by the Defense Production Administration from Aug. 18 to Sept. 21. The largest certificate granted in the week ended Sept. 21 was to Aluminum Co. of America which was permitted to write off rapidly 80 per cent of $11 million for construction of aluminum-reduction facilities near Rockdale, Tex.

New Taconite Plant: Ore Shortage Antidote



EXPANSION in the iron and steel industry and the dwindling of high-grade iron ore reserves are stimulating development of taconite as a source of blast furnace feed.

One of the moves forward is a decision by Reserve Mining Co., Cleveland, to proceed immediately with construction of a 2.5-million-ton-per-year beneficiating plant at Beaver Bay, Minn., to produce commercial quantities of high-grade iron ore from magnetic taconite. Contract for construction of the plant and a railroad has been awarded. The venture is expected to cost more than $75 million.

Room for Growth—Provision is being made in the construction program to enlarge the plant as required to a 10-million-ton-a-year facility.

The new plant will be located on the north shore of Lake Superior about 55 miles east of Duluth. A 47-mile railroad will connect the plant with Reserve's mining property at Babbitt, Minn., on the extreme eastern end of the Mesabi range.

Taconite will go through a crushing plant near the pit which is being opened up at Babbitt. The crude ore then will be transported to the Beaver Bay plant where it will be pulverized. The iron mineral will be extracted from the waste material by a magnetic separation process. Then the iron mineral will be rolled into walnut-size pellets and baked into hard balls in a pelletizing furnace. Finished pellets will be shipped to steel plants in the lower lakes region from docks within a new harbor adjacent to the plant at Beaver Bay. The pellets will be about 64 per cent iron. Cost of them will be competitive with other Lake Superior ores.

Guinea Pig—A 300,000-ton-per-year plant which Reserve has at Babbitt is being re-equipped. It will go into operation early next year and permit the beneficiating process to be studied further and developed to perfection while construction of the larger plant is under way.

Partners in Reserve Mining Co. are Republic Steel Corp., Armco Steel Corp., and National Steel Corp. Manager of Reserve is Oglebay-Norton & Co., Cleveland.

Porter Buys Buffalo Steel

More than 70,000-ton-a-year steel capacity was obtained by H. K. Porter Co., Pittsburgh, by purchase of Buffalo Steel Co., Tonawanda, N. Y.

Porter now has a total steel production capacity exceeding 200,000 tons. Last October it bought Connors Steel Co. in Birmingham.

No Tool Giveaway

The U. S. is speeding up disposal of reserve machine tools, but on a lease, not free basis

REPORTS that the government is giving away machine tools are unfounded.

What the government is doing is trying to step up its program to lease tools from the security reserve to defense contractors. That's being done to speed defense production and to free storage areas for other purposes. The latter factor is the reason why particular emphasis is being placed on clearing out the Marietta, Ga., plant so Lockheed Aircraft Corp., which took over the facility last February, can get to work on aircraft production.

One Per Cent a Month—Any contractor who leases a machine tool pays a rental of 1 per cent a month of the book value and must return it to the government's security reserve when he's finished with it.

The security reserve of machine tools is in existence because of circumstances just after World War II. Then, the government found itself the owner of thousands of machine tools. It sold some but couldn't dispose of all. Those it couldn't sell and some that it had set aside in case of emergency were picked over, the pickings assigned to the security reserve, with the Defense Department as custodian. Responsibility for the reserve was divided among the armed services; the Air Corps probably has the greatest number of tools, an estimated 10,000 in mid-September at Marietta and at the former Glenn L. Martin plant in Omaha, Nebr.

Speed-Up—To clear out the Mari-

ette plant, and ultimately the Omaha facility, the Air Force's Air Materiel Command has set up a new method of selecting withdrawals, but the selections are still leased on the 1 per cent plan as before. Suppliers seeking tools who have been approved by the NPA are studied and classified in five groups, with highest priority contract holders placed in Group 1. Graduated priorities fill the other groups. Representatives of those companies, in order of their grouping, are touring the storage plants to select personally the tools they want.

That method was adopted because no good inventory of the security reserve exists. Even a good inventory wouldn't tell the precise condition of the machines. Personal inspection of the condition is particularly necessary, for some of the equipment is as much as 50 years old.

Tool Builders Can Get V Loans

In another move to help crack the machine tool bottleneck, General Services Administration will guarantee V loans to machine tool builders for working capital and to finance necessary expansion of their facilities. Machine tool manufacturers need not have government direct contracts to qualify.

Previously, manufacturers who had government pool orders could receive advance payments of up to 30 per cent of the amount of the pool orders if private financing was not available. GSA says that plan proved inadequate in many cases and the necessary increase in production can not be financed solely by such means. But, the 30 per cent advances will still be available to holders of pool orders.

In those cases where NPA considers expansion by machine tool manufacturers will aid defense, GSA will guarantee V loans to finance the construction or acquisition of new facilities. GSA will also assist by installing the necessary equipment in such plants.

Toolbuilders Speed Shipments

Machine tools were shipped at a faster rate in August, and neared the June peak, National Machine Tool Builders' Association reports. Shipments in August reached 177.3 per cent of the 1945-1947 average, second-highest mark of the year. Foreign orders increased during the month, but total new orders dipped to 488.3 per cent of the average shipments of 1945-1947. Dollar volume of shipments in that period is estimated to average $354 million. To give a more accurate picture of backlog and production, the association has introduced a new index ratio of unfilled orders to demonstrated production rate, rather than to shipments. That ratio for August was 22.8 to 1, as compared with 22.0 to 1 in July. Spurt in August shipments is probably a result of attention by the government to production problems of the tool builders and an increase in subcontracting volume.

British Columbia Reports

Using local resources, metals industries of the province are pushing back the frontier

ONE OF THE newest industrial frontiers in North America is opening in British Columbia, Canada.

As rough and ready as the country in which they live, the metals industries of the province are rolling

up their sleeves and clearing the ground for bigger production jobs ahead. Here's how they are getting ready to use the resources close at hand instead of relying on imports from areas more fully developed.

Steel—Three associated, yet separate, Vancouver companies, Vancouver Steel Co. Ltd., Vancouver Rolling Mills Ltd., and Pacific Bolt Mfg. Co. Ltd., have established a steel ingot and rolling operation that is helping to supply an ever-expanding demand in the area.

Since there is no basic steel production from iron ore in British Columbia, Vancouver Steel Co. produces electric steel ingots in billet size from steel scrap. These are sent to Vancouver Rolling Mills for reheating and processing into bar stock and structural shapes. About 25 per cent of the rolling mill output goes to Pacific Bolt Mfg. Co. for bolt and nut production. The rolling mill has a present output of 2000 tons monthly, of which 38 to 39 per cent is angles, flats, merchant and bolt rounds: Balance is reinforcing of which 80 per cent is deformed and 20 per cent plain rounds. British Columbia still cannot obtain sufficient shapes and structurals from local sources, so imports are coming in from Belgium, United Kingdom and Japan.

Iron Ore—Though they can't export any scrap materials, which are as short in British Columbia as they are in the United States, they can export iron ore. Argonaut Co. Ltd. is expanding mining operations on a new iron ore property near Campbell River and shipments have been made to Japan. Exports to Seattle and other points are planned.

Lead, Zinc—Another expenditure on mining operations is the $60 million being spent for increased power at the Trail and Kimberly plants of Consolidated Mining and Smelting Co. of Canada Ltd. in the Kootenay district of British Columbia. This firm is one of the world's largest producers of lead and zinc.

Aluminum—Actually pioneering in the Kitimat area on the British Columbia coast near Prince Rupert, Aluminum Co. of Canada Ltd. is investing $500 million in a power plant and reduction plant for producing aluminum. Kitimat, now a tiny Indian village, is expected to grow to a city of 50,000. Bauxite ore is to be brought in by ship. Electric power, 1.5 million horsepower worth, will be supplied by Alcan's powerhouse to be built near Kemano bay.

Power—Power supply being a big factor in aluminum production, elaborate plans for harnessing the waters of the Nechako river and its watershed have been made. Dams will stop the eastward flow of the Nechako river and the waters of its tributary lakes. A 10-mile tunnel will be driven in from the Kemano bay area and tap the reservoir at its westward end, providing a 2600-foot head for the power plant. Transmission lines will then carry the power over the 48 miles to Kitimat.

The power plant and reduction plant being planned would permit electric smelting of 1100 million pounds of aluminum per year, enough to have a pronounced effect on the world markets for the metal.

Boron Meets the Test

Users of boron steels report on how they work at an SAE meeting in Detroit

IMPRESSIVE performance results with the boron-treated lean-alloy steels are leading users to believe that those in time will save them from alloy starvation.

Tests in a number of applications were reported by members of the Society of Automotive Engineers' Iron & Steel Technical Committee—Division VIII—Boron Steels, in Detroit last Monday. In most instances the boron-bearing steels were found to be equal to their alloy-heavy cousins. The satisfactory nature of most of these steels is responsible for NPA's Iron & Steel Division Metallurgy and Conservation Chief, E. J. Hergenroether, urging more people to use the boron steels. He indicates that alloy savings of 50-75 per cent may be possible with the new steels (For additional remarks by Mr. Hergenroether see p. 50).

Up for Discussion—On the agenda were discussions of high carbon boron steels for springs; medium carbon steels for shafts, steering knuckles and forgings; bolt steels; boron steels for pressure vessels and other applications where heat-treatment is not feasible; carburizing principles; high hardenability steels for gears; medium hardenability steel; and low-alloy carburizing steels.

Also discussed were the specifications of eight boron steels which may be adopted as Tentative Standard grades. These are: 40B37, 80B37 and 14B35 (all for bolt-making), 50B50, 50B60 and 81B40, 43BV12 (already recognized as standard for aircraft applications) and 43BV14. Following steels are being considered for hardenability bands, action on approved ones expected to be taken within about a month: 94B17, 94B20, 14B35, 14B50 and 86B45.

They Like It—Two bolt men reported that 40B37 modified is admirably suited to their needs. R. R. Leo of American Steel & Wire Co. said this steel is "one of the nicest bolt wires I've seen." H. L. Hopkins of National Screw & Mfg. Co. said that in up to ½-inch sizes this steel produces 100 per cent good bolts. For hot-wound springs E. T. Bittner of American Steel Foundries said they had found no difference in performance between boron and conventional steels. Much the same report was made by R. H. Lundquist of Minneapolis-Moline Power Implement Co. on forged tractor axles of 81B50. "In our opinion excellent service results from the axles produced can be expected," he said.

Interesting results in carburizing were reported in similar tests conducted independently by W. E. Jominy, Chrysler Corp., and R. F. Thomson, General Motors Research Laboratories. Both said that when carbon is 0.90 the boron steels showed greater hardenability than the non-boron-bearing steels, and Mr. Jominy reported a good increase in hardenability continues when steels are over 0.90 carbon. Tests were made with steels of the same heat, boron being added to half of the steel.

Yes and No—H. J. Bates of Fairfield Mfg. Co. reported on a comparison of 80B20 and 8625H and 8620H in gears and pinions. With the boron steel, satisfactory case and core hardness can be obtained, distortion of spiral bevel teeth is within satisfactory limits, but dimensional change in bore is greater than normal and change in manufacturing practice will be required. For a spiral bevel gear for heavy-duty trucks 80B20 was found by Mr. Bates not to meet the customer's "file hard" specification, and would not in his opinion be satisfactory for this use. Pinions made of 94B17 were heat-treatable to satisfactory surface, core and shank hardness without excessive distortion.

E. F. Bittner of Borg-Warner Corp.'s Detroit Gear Division, also comparing 80B20 with 8620H in gear applications, said the gear teeth up to 8 pitch in the boron steel harden out fairly well, but bearing surfaces backed up by massive sections do not. As tested, 80B20 is not equivalent to 8620H in all applications, he stated, but indicated that further tests will be made, changing heat-treatment practice, to learn whether the deficiency can be overcome or reduced. Comparison of 80B40 with 8645 in the main shaft of an automatic transmission showed that the response to induction hardening was about the same, effect of tempering was also about the same, and results of torsion fatigue tests with the boron steel compare favorably.

'Steel Serves Nation'

"Steel Serves the Nation" is the title of a 227-page book just published to commemorate U. S. Steel Corp.'s 50 years in business.

The book presents a summary of the principal achievements and services of U. S. Steel since its formation in 1901. That history, plus a statistical analysis of how steel ingot production has increased since formation of the corporation, gives graphic illustration of how America has "passed . . . from the Iron Age to Steel . . ."

Harbison-Walker Adds Capacity

Moving to enter a wider field in production of basic refractories and later of silica refractories, Harbison-Walker Refractories Co., Pittsburgh, completed negotiations to acquire the Warm Springs, Calif., plant of LaClede Christy Co., Chicago. The California plant has been making tank blocks and specialties for the glass industry.

Blast Furnace Output Declines

Blast furnace production declined slightly in August but was sufficiently high to be the third best monthly outturn this year.

August output totaled 6,062,753 net tons, the American Iron & Steel Institute reports. The August performance was exceeded by that in May and July.

To turn out the August tonnage, blast furnaces operated at 98.5 per cent of capacity.

The August blast furnace production comprised 6,004,641 net tons of pig iron and 58,112 net tons of ferromanganese and spiegel.

Total blast furnace output in the first eight months of this year was 10 per cent ahead of that in the comparable period of last year. Additional data and comparisons—in net tons—are in this table:

	Pig Iron	Ferromanganese and Spiegel	Total Blast Furnace Output
1951			
July	6,069,717	60,037	6,069,754
August	6,004,641	58,112	6,062,753
8 mos.	46,772,493	484,297	47,256,790
1950			
August	5,724,577	45,786	5,770,363
8 mos.	42,350,758	431,989	42,787,747

Another Record Year?

The steel castings industry now is producing at a rate rapidly approaching the all time high of 1944. That was reported to the annual meeting in Hot Springs, Va., of Steel Founders' Society of America, by F. Kermit Donaldson, executive vice president of the society.

The country's 250 steel foundries are producing at a rate in excess of 2,200,000 tons yearly, according to Bureau of Census figures, which is more than 150 per cent above 1950 when 1,461,667 tons were shipped. The all time high of 2,445,421 tons were shipped in 1944. Major problem facing foundries is shortage of vital alloying elements.

PIECEMEAL PRODUCTION: One of 90 West Coast manufacturers who wanted to farm out subcontracts at the Military Business Opportunity Display in Inglewood, Calif., a representative of Consolidated Vultee Aircraft Corp., San Diego, Calif., adds another subcontractor to those working on parts for the B-36 intercontinental bomber. P. V. Gaughen (left), subcontracting supervisor of Convair, enlists J. J. Brown (center), president of Western Stamping Inc., Los Angeles, to turn out magnesium aileron quadrants. George Byrnes (right), chief of the U. S. Air Force Small Business Office, Western Air Procurement District, Los Angeles, looks on

Subcontractors Become VIP's In Defense Program

SUBCONTRACTS number as many as 1500 on some prime defense contracts. That's why prime contractors are vitally interested in finding qualified sources for subassembly manufacture. Result: Subcontractors become Very Important People.

For example, Texas Engineering & Mfg. Co. Inc., Dallas, began a cataloging and classifying system which assures would-be subcontractors of every opportunity to bid on current work and future jobs Temco may put out. Some of the catagories in which Temco has sorted their 543 registrants are: Castings, crates and boxes, forgings, machine shop work, and welding.

Never Lost—Among the subcontractors which have been "found" is Hudson Motor Car Co., Detroit. Hudson will manufacture forward fuselage sections of Boeing Airplane Co.'s B-47 Stratojet. Though exact figures are not revealed, the value of the contract is said to run into the millions.

Evans Products Co., Plymouth, Mich., also has a subcontract to manufacture parts for Boeing. This is one of Evans Products' seven new prime and three subcontracts on defense work which total $10 million. Other subcontracts are for master and articulated rods for the 3350-30W Wright aircraft engine and parts for the General Electric jet engine Packard is building.

Sub-Subs—A subcontract to manufacture and assemble complete fuselage aft sections for Republic Aviation Corp.'s F-84 Thunderjet fighter was obtained by Kaiser Metal Products Inc., Oakland, Calif. Officials of Kaiser Metal Products state that 20 to 25 per cent of the precision machine work for this contract will be subcontracted to other industries in the area of the company's Bristol, Pa., plant, where the work will be done.

Prime and subcontracts totaling $2,363,510 for light and medium tank parts have been awarded to Mechanics Universal Joint Division, Memphis, Tenn., plant of Borg-Warner Corp., Chicago.

Other contracts awarded by the government, in excess of $250,000, follow in the table below.

Product	Contractor
Mountings, Cable Assemblies	Kings Electronics Co., Tuckahoe, N. Y.
Radio Sets	Emerson Radio & Phonograph Corp., New York
	Utility Electronics Corp., Newark, N. J.
	Raytheon Mfg. Co., Waltham, Mass.
Connectors	Arey Machine Co., Hillside, N. J.
Capacitors	Cornell-Dubilier Electric Corp., Plainfield, N. J.
Radiac Detector Chargers	Kelley-Koett Instrument Co., Cincinnati
Teletypewriter Sets	Ralph C. Coxhead Corp., Newark, N. J.
Cupola Assemblies	DeMattia Machine & Tool Co., Clifton, N. J.
Door Assemblies	Rocklin Mfg. Co., Sioux City, Iowa
Truck Tractors	White Motor Co., Cleveland
U. S. Navy Utility Loader Cars	Evans Products Co., Plymouth, Mich.
Bailey Bridge	Ceco Steel Products Corp., Chicago
	Decatur Iron & Steel Co., Decatur, Ala.
	Marinette Marine Corp., Marinette, Wis.
Tank Automotive Spare Parts	Steelcraft Mfg. Co., Rossmoyne, O.
Repair Parts for Diesel Engines	Chrysler Corp., Fargo Division, Detroit
Spare Parts and Magnetos	Fairbanks, Morse & Co., New York
Components, Type N-1 Compass System	Scintilla Magneto Division, Bendix Aviation Corp., Sidney, N.Y.
Aircraft Spare Parts (2 contracts)	Kearfott Co. Inc., Little Falls, N. J.
Aircraft Spare Parts	North American Aviation Inc., Columbus, O.
	Canadian Commercial Corp., Montreal, Canada
Turbosuperchargers	Lockheed Aircraft Corp., Burbank, Calif.
Fuze E24	Douglas Aircraft Co. Inc., Santa Monica, Calif.
	Hotpoint Inc., Chicago
Fuze M501	Barley-Earhart Corp., Portland, Mich.
Fuze M84	Lionel Co., New York
Motor Fin Shell	Eastman Kodak Co., Rochester, N. Y.
Cartridge Case	Precision Castings Co. Inc., Fayetteville, N. Y.
Boosters	Precision Castings Co. Inc., Fayetteville, N. Y.
Shackles, Spacers, and Adapters	Revere Copper and Brass Inc., Rome, N. Y.
I. D. Rings	Sargent & Co., New Haven, Conn.
	Graybar Electric Co. Inc., New York
	Graybar Electric Co. Inc., New York

new equipment will include boring mills, furnaces, welding equipment, expanders and drill presses.

A plant addition of about 20,000 square feet, complete with all new facilities, should be in operation soon after Jan. 1. Other additions of plant space will be acquired either through new construction or leasing of existing space. The company's plant now has about 170,000 square feet.

Where the Arms Orders Go

Many new company names and geographical areas are showing up near the top of the government contract distribution list, replacing the leaders of World War II.

Predominance of orders for aircraft and ordnance are the reason, says the National Industrial Conference Board, which surveyed defense contract allocations. Shipbuilding traditionally gets a high percentage of defense dollars but currently gets less than 2 per cent. That's because the moth-ball fleet is taking care of most immediate shipping needs.

Nearly a third of all orders for military supplies and equipment have gone to two states—New York and California. Three quarters of all prime contracts have gone to the top ten. They include: Michigan, Ohio, Indiana, Connecticut, Illinois, New Jersey, Pennsylvania and Massachusetts.

In company distribution, General Motors still tops the list with prime contracts of over $3.5 billion, nearly twice the percentage share of war orders it had during the last war. Ford Motor Co. follows GM in ranking with orders totaling $1 billion. Boeing Aircraft has stepped up to third place, and Curtiss-Wright moved downward to fourth. About one of three companies on the current list of the 50 biggest government contractors manufacture aircraft. The comparable 1940-1944 ratio was less than one in four.

Lockheed Tools for Big Job

A new technique in air transport design is a one-piece, 32-foot-long wing section for Super Constellations (see the photo).

Lockheed Aircraft Corp., Burbank, Calif., which did six years of research on the project, says the piece of wing is the largest ever fabricated. Cut from a solid slab of metal, it will replace some 1500 individual parts and 5000 rivets. The object of the one-piece construction is to make planes stronger without adding weight, to meet new aircraft speed and altitude requirements.

New tooling will be installed at Lockheed facilities to turn out the wing piece by revised assembly methods. Soon it can be mass-produced on the company's $400,000 Giddings & Lewis mill (STEEL, Sept. 24, p. 98). Cost of the first piece is an estimated $7000. Super Constellation wings require six long panels.

Integral stiffening is the key to construction of the wing piece. Formerly wing sections were built of a framework of small, riveted pieces covered with a thin metal skin. The new method is to make such sections by cutting channels down the length of 1¾-inch thick slabs, leaving standing ribs almost 3 16-inch thick as stiffeners.

32-FOOT WING SECTION
. . . replaces 1500 parts

Warren Pipe & Foundry Sold

Controlling interest in the Warren Pipe & Foundry Corp., New York, was acquired by Solomon E. Shahmoon, a member of the New York Stock Exchange. The company has plants at Phillipsburg, N. J., and Everett, Mass., and an iron mine in Morris county, N. J. Modernization of the Phillipsburg plant, which produces pit-cast pipe, is under discussion.

Packagers Ready Exhibit

The protective packaging and allied handling industries exhibit their products Oct. 2-4 at Cleveland's Public Auditorium. The event is the annual Industrial Packaging and Materials Handling Exposition, sponsored this year by the mechanical engineering department of Case Institute of Technology, Cleveland.

CHECKLIST ON CONTROLS

GOVERNMENT control orders are digested or listed each week in this "Checklist on Controls." For complete copies of NPA orders, write to NPA Distribution Section, First Basement, New GAO Bldg., Washington 25. For copies of OPS orders, contact nearest OPS district or regional office. For copies of OPS news releases, write David S. Phillips, director, OPS Administrative Services Division, Temporary E Bldg., Washington 25.

Materials Orders

TIN—Amendment of Sept. 8, 1951, of NPA Order M-8 extends current limitations on use of pig tin to succeeding calendar quarters.

MINING MRO—Amendment of Sept. 21, 1951, of NPA Order M-78 makes three administrative corrections in this order covering maintenance, repair and operating supplies and capital additions for the mining industry.

NPA Regulation

CHEMICAL PRIORITIES—Direction 3 to NPA Regulation 2 restricts use of defense ratings for purchase of chemicals to the Department of Defense and the Atomic Energy Commission on and after Sept. 25, 1951. All other users of chemicals must buy them through normal market procedure without assistance of ratings.

NPA Delegation

CONSTRUCTION — Amendment of Sept. 25, 1951, of NPA Delegation 14 clarifies the scope of authority granted to the secretaries of the interior and of the Army in carrying out approved construction programs.

Price Regulation

MACHINERY—Amendment 26 to Ceiling Price Regulation 22 and Amendment 14 to Ceiling Price Regulation 30 permit certain manufacturers to apply for a substitute method for figuring material cost increases. Both amendments were effective Sept. 22, 1951.

OPS Grants Relief for New Firms

New manufacturers who cannot determine ceiling prices under the machinery regulation, CPR 30, because they were not in business before Jan. 1, 1951, may now apply to OPS for approval of proposed ceilings or of a price determining method.

Application should be made on OPS public form No. 90 or 91 and sent by registered mail to OPS in Washington. If no action is taken by OPS within 30 days after receipt of application, the proposed ceilings will be considered approved. Prior to OPS approval, a seller may quote or charge the proposed ceilings but may not accept payment for more than 75 per cent of the ceiling price until after approval has been given.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor*

Metallurgists get Washington welcome from ECA and ASM officials. Complaints are reaching the White House over delays in setting up Small Defense Plants Corp.

IF THE FOREIGN delegates to the World Metallurgical Congress had an advance impression that America is the land of plenty, they probably weren't unduly shocked at being served a fine roast beef dinner with trimmings when they visited Washington.

On the occasion the two sponsoring groups—American Society for Metals, which is conducting the congress and was host at the dinner, and Economic Cooperation Administration, which is paying the expenses of the foreign visitors—welcomed the first 180 of the delegates to enter the country. The remaining 220 who accepted invitations will receive their welcomes somewhere along the industrial route that was laid out. The itinerary will include major automobile, steelmaking and fabricating plants in the United States, and such outstanding research centers as Massachusetts Institute of Technology and Harvard, Yale and Princeton Universities.

Welcome Words—At the Washington party welcoming speeches were by Dr. Zay Jeffries, director general of the World Metallurgical Congress; Walter E. Jominy, president of American Society for Metals; Dr. Edward U. Condon, resigning director of the National Bureau of Standards; and Dr. Oliver S. Buckley, board chairman of Bell Telephone Laboratories and chairman of the Science Advisory Board, Office of Defense Mobilization.

Responses were made by Raghunath G. Bhatawadekar, chief metallurgist of India's Ministry of Railway, and Pierre Van der Rest, general manager, Belgian Blast Furnace & Steel Works Association, and head of the Belgian representatives of the Organization for European Economic Co-operation.

Prodding the President . . .

Loud complaints from Congress and other sources are reaching President Truman over the delay in creating the new Small Defense Plants Corp. Such an agency—to function much along the lines of the Smaller War Plants Corp. of World War II—was provided for in the Defense Production Act Amendments bill signed by the President on July 31. Sen. Andrew Schoeppel (R., Kans.) terms the delay "prime and concrete evidence of do-nothing on the part of the President and of a fiddling White House." Explanation of the delay was requested in a telegram sent to the White House by an influential group of business leaders.

Blow Ye Winds . . .

Designers of electrical generating equipment may soon be faced with the need for developing a new type of unit—a wind-driven generator. H. R. 4286, now under study by the House Interior and Insular Affairs Committee, would authorize the Interior Department to erect a small experimental pilot plant with capacity of about 7500 kilowatts. Interior officials believe that information obtained from experimental wind-driven machines in the United States and Europe will keep the entire cost within an appropriation of $2.5 million to $3 million.

Because wind does not blow with constant intensity, the generators would be connected with electric power grid systems to which hydroelectric or fuel-electric generating plants are also interconnected. Present thinking is in terms of small-capacity units at scattered windy locations rather than single large plants.

The wind-power project is supported enthusiastically by legislators from the semi-arid western states where water conservation is a big problem.

Explanation for Toolbuilders . . .

Machine tool manufacturers will have available shortly an instruction sheet to assist them in establishing selling prices to meet approval by the Office of Price Stabilization. Specifically, the instructions tell how to fill out Form 8 pursuant to the provisions of CPR 30, Supplementary Regulation 2, Revision 1.

WATCH OUT FOR AIRPLANES: Standard off-the-highway equipment, like this Caterpillar D7 Tractor pulling a LeTourneau Carryall and diesel motor grader in the background, is being drafted for military construction work in Korea. Air Force engineers move as much as 45,000 cubic yards of dirt for each airstrip they construct. Occasionally an incoming airplane knocks out a piece of equipment still finishing the work on the edge of the landing strip

BAKER TRUCKS require LESS MAINTENANCE

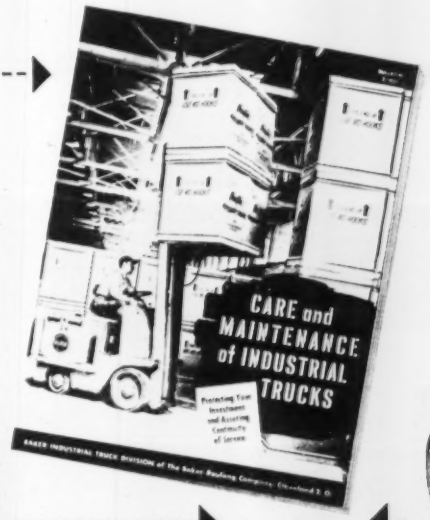
to you this means

- LESS TIME OUT OF SERVICE
- TOP OPERATING EFFICIENCY
- LOWER OVERALL COST

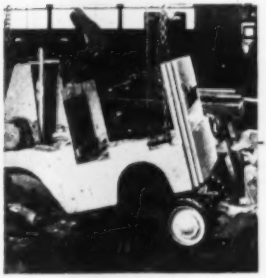
Baker Trucks are engineered and constructed to give maximum trouble-free service, and designed with many features for easier preventive maintenance and quicker, less costly repairs, when necessary. For example:

Electric dynamic braking saves wear on brake linings and protects drive axle and other moving truck parts by smoother, safer deceleration. Service brakes can be adjusted in 5 minutes, and relined in 30 minutes.

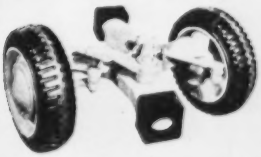
Baker exclusive Worm Drive Power Axle has fewer moving parts, is less subject to wear and does not lose efficiency with heavy loads or after long use. Mast assembly can be removed in 20 minutes and power axle pulled in 40 minutes.



Baker Rubber-mounted Trailing Axle is the simplest in use on industrial trucks. Can be removed from truck in less than 20 minutes by disconnecting steering tie rod and removing 8 bolts. Proper steering geometry prevents "scrubbing" of tires and means longer tire life.



Use of jumbo rubber blocks to absorb twisting axle action and road shocks eliminates need for spring connections. Blocks require no attention. Steering connections are above axle where they are protected from damage. Wheel bearings easily examined.



The above are 4 of the 60 illustrations from the new 16-page picture-story manual "Care and Maintenance of Industrial Trucks." *Write for your copy today.*

BAKER INDUSTRIAL TRUCK DIVISION
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GOULD

Plus-Performance Plan

REGULAR WATER ADDITIONS

ADD MONTHS TO BATTERY SERVICE!

Distilled water containers should be movable and fitted with hose and nozzle to make watering quick and easy.

The amount of water used by a battery indicates its general condition. That's why regular, systematic watering is so important to maximum battery service. The GOULD PLUS-PERFORMANCE PLAN gives you complete technical information, not only on how to establish a regular watering routine, but on practically every problem connected with storage battery use.

Comprising manuals, articles, specifications, bulletins, charts, graphs and forms, the GOULD PLUS-PERFORMANCE PLAN tells you how to select, charge and handle, maintain and determine the condition of your batteries. Use it consistently and you can improve your battery performance as much as 50%! All material is free. A request will bring descriptive booklet by return mail.

WATERING ROUTINE CUTS DOWN-TIME BOOSTS PRODUCTION

Level of electrolyte should be maintained between low and high level points. The minimum low level point should be above the splash cover. Maximum high level point is just under the bottom of the vent-well in the cover.

It is normal for electrolyte level to decrease very gradually with use. Rapidity of decrease will depend upon how much charge it receives over and above what it requires. Under normal conditions, a battery does not require water more often than once in one or two weeks when it is in full cycle service.

Only water that is known to be suitable for storage batteries should be used. It should be pure and free from any contamination. Distilled water is recommended. Water should be kept in clean containers of glass, plastic or porcelain with cork, glass or rubber stoppers.

The GOULD "Thirty" with "Z" Plates—America's Finest Industrial Truck Battery

GOULD STORAGE BATTERIES

GOULD-NATIONAL BATTERIES, INC., TRENTON 7, NEW JERSEY

Always Use Gould-National Automobile and Truck Batteries

Who's Who in the Defense Organization

IN THIS the third edition of STEEL's *Who's Who in the Defense Organization* appears an up-to-date directory of key defense contact men. Other directories have appeared Feb. 26 and April 23, 1951. In the Sept. 10 issue appeared a directory of personnel in NPA's Industrial & Agricultural Equipment Bureau; it is not included in this directory.

OFFICE OF DEFENSE MOBILIZATION

Executive Office Bldg. ....EXecutive 3300

Director: Charles E. Wilson, Ext. 2101, Room 102.

Assistant to Director, for Production: Clay P. Bedford, Ext. 2116, Room 105½.

Assistant to Director, for Manpower: Arthur S. Flemming, Ext. 2223, Room 187.

Assistant to Director, for Materials: David D. Irwin, Ext. 2057, Room 105½.

Information Officers: Andrew H. Berding, Ext. 471, Room 174; Scott Hershey, Ext. 194, Room 174½; Stanley Baitz, Ext. 2201, Room 8S.

DEFENSE PRODUCTION ADMINISTRATION

New GAO Bldg. STerling 5200

Administrator: Manly Fleischmann, Ext. 4461 Room 3H2.

Acting Deputy Administrator, for Foreign Coordination: Frederick Winant, Ext. 5333, Room 4G1.

Assistant Administrator, for Labor: Joseph Keenan, Ext. 4471, Room 4A4.

Deputy Administrator, and Chairman Aircraft Production Board: Harold R. Boyer, Ext. 5037, Room 4A5.

Deputy Administrator, for Program and Requirements: Ralph S. Trigg, Ext. 5310, Room 4G7.

Deputy Administrator, for Procurement & Production, and Chairman Production Executive Committee: Clay P. Bedford, EXecutive 3300, Ext. 2116, Room 105½ Executive Office Building.

Assistant Administrator, to Coordinate National Defense Mobilization Committees: Eugene F. Bertrand, Ext. 3151, Room 4B6.

Director, Conservation Division: Howard Cossley, Ext. 3401, Room 4F1.

Acting Deputy Administrator, for Resources Expansion: Byron D. Woodside, Ext. 3919, Room 4L16.

Electronics Production Board, Chairman: Edmund T. Morris, Ext. 3828, Room 4B6.

Critical Areas Committee, Chairman: Ralph R. Kaul, Ext. 3728, Room 4A5.

Director of Information: Edward K. Moss, Ext. 4466, Room 3N1.

Deputy Director of Information: Albert J. Lubin, Ext. 4464, Room 3N1.

NATIONAL PRODUCTION AUTHORITY

New GAO Building (unless otherwise noted)

STerling 5200

Administrator: Manly Fleischmann, Ext. 4461, Room 3R2.

Deputy Administrator: Henry H. Fowler, Ext. 4476, Room 3P2.

General Counsel: John Alexander, Ext. 4301, Room 3Y14.

Director of Compliance: John Peckham, Ext. 4393, Room 3R15.

NPA Metals & Minerals Bureau

Assistant NPA Administrator for Metals & Minerals: Norman W. Foy, Ext. 3351, Room 2C1.

Deputy Assistant Administrator: S. B. Coolidge Jr., Ext. 3351, Room 2C1.

Administrative Officer: Burton M. Graham, Ext. 5656, Room 2A4.

Information Officer: Louis H. Gerteis, Ext. 4443, Room 4F1.

NPA Aluminum & Magnesium Division, Room 2N1.

Acting Director: Timothy A. Lynch, Ext. 5631.

Assistant to Director: Herbert L. Cullen, Ext. 3971.

Requirements & Distribution Branch Chief: Connor B. Batman, Ext. 3778.

Program & Statistics Branch Chief: S. W. Blumenreich, Ext. 5597.

Magnesium & Titanium Branch Chief: Perry D. Heiser, Ext. 5520.

Facilities & Construction Branch Chief: Henry M. Scott, Ext. 3610. Assistants: Bailey P. Byars and J. K. Thompson, Ext. 3610.

Pig & Ingot Section Chief: Conrad Briel, Ext. 4449. Metallurgical Uses of Aluminum: John C. West, Ext. 4844.

Warehouse Section Chief: Theodore E. Boeger, Ext. 4737.

Sheet Section Chief: Robert T. Farrel, Ext. 3066.

Castings Section Chief: Lloyd A. Mapes, Ext. 4718.

Army Requirements Section Chief: Augustus Martin, Ext. 5550.

Navy Requirements Section Chief: E. W. Dugges LaTouche, Ext. 5036.

Air Force Requirements Section Chief: George F. Mahoney, Ext. 5036.

Non-Military Government Requirements Section Chief: Robert E. Heffernan, Ext. 3666.

Extrusion Section Chief: Edgar F. Gore, Ext. 5036.

Commodity Industry Analysts: William E. Fitch, Ext. 5603, Thomas A. Ritchie, Ext. 5549.

Consultant: Jacob B. Neiman, Ext. 5631.

NPA Copper Division, Room 2H13

Director: F. H. Hayes, Ext. 3318.

Deputy Director: Joseph W. Mullally, Ext. 3275.

Wire Mill Branch Chief: E. S. Rising, Ext. 3924.

Foundry Branch Acting Chief: Lt. Cdr. William A. Meissner Jr., Ext. 3376. **Acting Assistant Chief:** Julian A. Porter, Ext. 3376.

Conservation & Technical Section Chief: Harold B. Gardner, Ext. 5429.

Allocation & Records Section Chief: R. Barndell, Ext. 3970.

Program Section Chief: Dennis F. O'Connor, Ext. 5469.

Facilities Section Chief: Walter Clark, Ext. 5469.

Assistant to Director: Lenox C. Chew, Ext. 3943, Paul B. Andrews, Ext. 4920; Lionel T. Bonner, Ext. 4607; William F. Cox, Ext. 3944; Frank Spitale, Ext. 4924; Myron Tritsch, Ext. 5404; C. P. Williams, Ext. 5089; William E. Bradford, Ext. 4614.

NPA Iron and Steel Division, Room 2H8.

Director: W. B. Quail, Ext. 4346.

Deputy Director: Herbert Johnson, Ext. 3281.

Assistant to the Director: Frank T. McCue, Ext. 3962.

Consultant to the Director: E. D. Bickford, Ext. 3445.

Assistant Director and Chairman of Requirements Committee: Merrick McCafferty, Ext. 3510.

Assistant Director and Chairman of Production Directives Committee: J. F. Smith Jr., Ext. 5747. Secretary, Production Directives Committee: Charles Halcomb, Ext. 4637.

Assistant Director, in Charge of Facilities and Raw Materials Branch: R. J. Wysor, Ext. 3960.

MRO Section Chief: Frank A. Weidman, Ext. 4939.

Pig Iron Section Chief: J. A. Claussen, Ext. 4602.

Plant & Facilities Section Chief: H. L. Leyda, Ext. 3934.

Refractories & Fluxes Section Chief: Mrs. Marguerite M. Sauers, Ext. 4017.

Scrap Section Chief: Marvin S. Plant, Ext. 3782. Assistants: Boyd Outman, Ext. 3782; Charles M. Brooks, Ext. 3781.

Consultants: James L. Hyland, Ext. 5754; Frank Crockard, Ext. 4731; Harry W. Bryan, Ext. 5948; W. G. Whitsitt, Ext. 5948.

Statistician: Elliott S. Moorhead, Ext. 5601.

Assistant Director, in Charge of Ferroalloys & Metals Branch: James H. Critchett, Ext. 4795.

Ferroalloys Section Chief: Frederick F. Frankin, Ext. 3757. **Deputy Chief:** W. George Johnson, Ext. 5009.

Manganese & Silicon: D. H. Duff Jr., Ext. 4681.

Chromium: John N. Ludwig Jr., Ext. 3757.

Molybdenum: Harry Haas, Ext. 5067.

Cobalt: Ernest F. Mechlin Jr., Ext. 3757.

Columbium: Joseph B. Edie, Ext. 5810.

Tungsten: William D. Crawford, Ext. 5009.

Vanadium & Specialties: George T. Motock, Ext. 3757.

Requirements & Exports: P. A. Reinertsen, Ext. 5810.

Nickel Section Chief: Harold Larsen, Ext. 4682. Assistants: Frank R. Bailey, Ext. 4681; W. W. Alston, Ext. 4682; Oscar Haughom, Ext. 4682.

Pure Tungsten & Pure Molybdenum Section Chief: H. M. Lusk, Ext. 4695. Assistant: George C. Wheeler, Ext. 4960.

Assistant Director, in Charge of Metallurgy & Conservation Branch: E. J. Hergenroether, Ext. 4868.

Low-Alloy Steels: Veryl Graze, Ext. 3607; R. P. Donnell, Ext. 3046; E. V. Bennett, Ext. 5548.

Tool Steel: G. A. Barker Jr., Ext. 3046.

Stainless & Super-Alloy Steels: George A. Sands, Ext. 5544; E. Rowland, Ext. 3666; J. B. Henry, Ext. 5544.

Nickel & Chromium Plating: R. B. Saltonstall, Ext. 5548.

Welding & Hard Facing: W. J. Lindner, Ext. 5544.

Nonferrous Alloys: H. K. Herschman, Ext. 3607.

Pipe Section Chief: C. T. Hapgood, Ext. 4037. Assistant: A. B. Schoen, Ext. 4037.

Tube Section Chief: James S. Anderson, Ext. 5439. Assistant: Willis J. Resiner, Ext. 5439.

Wire Section Chief: Norman Melville, Ext. 4656.

Sheet & Strip Section Chief: P. H. Pocock, Ext. 3691. Assistants: Milton Englert, Ext. 5991; William R. Nolan, Ext. 5992.

Bars & Semifinished Section Chief: John Walker, Ext. 5011. Assistant: George L. Anderson, Ext. 5012.

Warehouse Section Chief: James Hudson, Ext. 3651. Assistants: Charles Kramer, Ext. 3651; R. N. Carlin, Ext. 3650.

Forgings Section Chief: H. F. Weaver, Ext. 3005. Assistant: J. E. Sweeney, Ext. 3004.

Castings Section Chief: A. J. McDonald, Ext. 3080. Assistant: Francis J. Buckley, Ext. 3080.

Rails & Track Accessories Section Chief: Ray M. Thulean, Ext. 4271.

Alloy Steel Section Chief: John J. Boylan, Ext. 5706. **Assistant:** G. V. Bolger, Ext. 5706.

Cold Drawn Bar Section Chief: William A. Thompson, Ext. 3705. **Assistant:** S. C. Rogers, Ext. 3054.

Stainless Steel Section Chief: W. J. McCune, Ext. 4944.

Tool Steel Section Chief: Felix Kremp, Ext. 5948.

Tin Plate Section Chief: F. A. McClelland, Ext. 5008.

Structural Shapes Section Chief: Robert Smice, Ext. 4041.

Plate Section Chief: Paul Landis, Ext. 4947. **Assistant on Armor Plate:** D. S. Wolcott, Ext. 4949. **Assistant:** George W. Kirkley, Ext. 4949.

Priorities & Statistical Controls Section Chief: Kenneth H. Hunter, Ext. 3601.

Munitions Board Liaison Representative: Kenneth M. Heinrich, Liberty 5-6700, Ext. 72543.

International Section Chief: J. J. W. Palmer, Ext. 3816.

NPA Miscellaneous Metals & Minerals Division, Room 2A2.

Director: Harry B. Sharpe, Ext. 5361.

Assistants: John E. Steinhauer, Ext. 3091; Mary E. Lubig, Ext. 5068.

NPA Tin, Lead and Zinc Division, Room 2E1.

Director: Erwin Vogelsang, Ext. 4501.

Tin: W. L. Raup Jr., Ext. 3166; Arthur Fritschle, Ext. 3167.

Zinc: John Sellon, Ext. 4022; Maurice Marcotte, Ext. 3369.

Zinc & Cadmium: Mrs. Margaret Murphy, Ext. 3015.

Lead: James Owen, Ext. 3930; Arthur Cavanaugh, Ext. 3930.

Bismuth: M. E. Parkinson, Ext. 3370; Herbert O. Rogers, Ext. 5436.

NPA Office of Small Business, 3844 Commerce Bldg.

Acting Assistant NPA Administrator, for Small Business: James L. Kelly, Ext. 4670.

Assistant to Assistant Administrator: C. F. Hughitt, Ext. 5613, 1410 Tempo T. Bldg.

Acting Director, Materials & Equipment Assistance Division: Philip A. Bennett, Ext. 4618, 1431 Tempo T Bldg.

Management Assistance Division Director: Wilford L. White, Ext. 4805, 1440 Tempo T Bldg.

Economic and Production Research Division Director: J. C. Dockeray, Ext. 4806, 1440 Tempo T Bldg.

Procurement Assistance Division Acting Director: T. N. Asbury, Ext. 3011, 1450 Tempo T Bldg.

Pooling Section Chief: Wendell O. Metcalf, Ext. 4615, 1323 Tempo T Bldg.

NPA Office of Labor, 5010 Commerce Bldg.

Assistant NPA Administrator, for Labor: O. A. Knight, Ext. 3311.

Deputy Assistant Administrator: Ted F. Silvey, Ext. 3311.

NPA Office of Public Information, Room 3N1.

Director of Public Information: Edward K. Moss, Ext. 4466.

Deputy Director: Albert J. Lubin, Ext. 4464.

Information Division Chief: Rollen B. Kadesch, Ext. 4443, Room 4H4.

Who's Who in the Defense Organization

NPA Appeals Board, 5800 Commerce Bldg.

Chairman: T. Munford Boyd. Ext. 3820.
Secretary: John J. Barron, Ext. 3912.
Information Officer: Morton A. Reichek, Ext. 4443.

NPA Textile, Leather & Specialty Equipment Bureau

Assistant NPA Administrator: Horace B. McCoy, Ext. 3421, Room 3840 Commerce Bldg.
Deputy Assistant Administrator: Richard W. Murphy, Ext. 3458, Room 3844 Commerce Bldg.
Information Officer: Virgil R. Hassler, 4FL New GAO Building, Ext. 4443.
Aircraft Division Chief: Joseph J. Mitchener, Ext. 5813, Room 1067 Tempo T Bldg.
Communication Equipment Division Chief: Luther W. Hill, Ext. 4128, Fifth Floor 801 E. N. W.
Consumers Durable Goods Division Chief: H. J. Holbrook, Ext. 4761, Fourth Floor 801 E. N. W.
Electronics Division Chief: Edmund T. Morris, Ext. 3585, Second Floor 801 E. N. W.
Leather & Leather Products Division Chief: Julius Schnitzer, Ext. 3639, Room 2131 Tempo T Bldg.
Motion-Picture-Photographic Products Division Chief: Nathan D. Golden, Ext. 3171, Room 3828 Commerce Bldg.
Ordnance and Shipbuilding Division Chief: W. C. Park, Ext. 5231, Room 2305 Tempo T Bldg.
Salvage Division Chief: Edward W. Greb, Ext. 4017, Room 1069 Tempo T Bldg.
Scientific and Technical Equipment Division Chief: Howard A. Pringle, Ext. 5804, Room 2258 Tempo T Bldg.
Service Equipment Division Chief: Cameron B. Lynham, Ext. 5892, Room 2150 Tempo T Bldg.
Textile Division Chief: A. Henry Thurston, Ext. 4097, Room 2007 Tempo T Bldg.
Water Resources Division Chief: Harvey S. Howe, Ext. 4064, Room 1105 Tempo T Bldg.

NPA Mailing List

First basement East New GAO Bldg.
Distribution Branch Chief: E. E. Vivian, Ext. 5703.

NPA Chemical, Rubber & Forest Products Bureau

Assistant NPA Administrator: Francis J. Curtis, Ext. 4241, Room 2Y1.
Deputy Assistant Administrator: G. J. Tisoulat, Ext. 4893, Room 2Y1.
Chemical Division Director: Kenneth Kipstein, Ext. 3112, Room 2253. **Chief, Aromatic & Coal Tar Chemicals Branch:** L. A. Schluter, Ext. 5033.
Containers and Packaging Division Director: Robert de S. Couch, Ext. 3461, Room 2491.
Lumber & Lumber Products Division Director: C. A. Bruce, Ext. 3707, Room 2P2.
Printing & Publishing Division Director: Arthur R. Treanor, Ext. 3295, Room 2P2.
Pulp, Paper & Paper Board Division Director: John W. Mahoney, Ext. 4732, Room 2T1.
Rubber Division Director: L. E. Spencer, Ext. 3434.
Information Officer: Clyde W. LaMotte, Ext. 4443, Room 4FL.

NPA Facilities & Construction Bureau

Assistant NPA Administrator: Frank R. Creedon, Ext. 5151, Room 207 Old GAO Bldg.
Assistant to Assistant Administrator: William R. Davlin, Ext. 5431, Room 204 Old GAO Bldg.
Building Materials Division Director: John L. Haynes, Ext. 3803, Room 328 Old GAO Bldg.
Deputy Director: Charles P. Redick, Ext. 4072, Room 325 Old GAO Bldg.
Construction Controls Division Director: Rufe R. Newman, Ext. 3412, Room 312 Old GAO Bldg. **Deputy Director:** Stephen Burns, Ext. 4012, Room 311 Old GAO Bldg.
Industrial Expansion Division Director: William E. O'Brien, Ext. 5545, Room 330 Old GAO Bldg.
Loan Division Director: Harvey M. Harper, Ext. 3558, Room 306 Old GAO Bldg. **Assistant to Director:** Carl Scheid, Ext. 4593, Room 305 Old GAO Bldg.
Tax Amortization Division Director: Ross A. Gridley, Ext. 5587, Room 212 Old GAO Bldg.
Deputy Director: Jacob Friedman, Ext. 5588, Room 213 Old GAO Bldg.
Information Officer: William J. Digges, Ext. 4443, Room 4FL New GAO Building.

NPA Office of Assistant Administrator for Production Controls, Room 3K2.

Assistant Administrator for Production Controls: Walter C. Skuce, Ext. 4111.
Deputy Assistant Administrator: William C. Truppner, Ext. 5107.
Assistant to the Assistant Administrator: William Easton, Ext. 4930.
Technical Coordination Division Director: John F. Skillman, Ext. 5291.
Education Branch Chief: Hardy M. Ray, Ext. 5293.
Information Officer: Bruce H. McClure, Ext. 4443, Room 4FL.

NPA Office of Industry Advisory Committees, 4L1.

Office of Industry Advisory Committees Director: G. Lyle Belsley, Ext. 5511.

NPA Office of Field Service, Room 3890 Commerce Bldg.

Office of Field Service Director: Carlton Hayward, Ext. 3641.
Deputy Director: Joseph A. Mack, Ext. 2405.
Special Assistant to the Director: C. Sterry Long, Ext. 3408.

NPA Office of Civilian Requirements, Room 5001A Commerce Bldg.

Assistant NPA Administrator, for Civilian Requirements: Lewis Allen Weiss, Ext. 4617.
Deputy Assistant Administrator: Walter J. Chatrie, Ext. 4701.
Consumer Food Products Division Director: Leslie P. Dodge, Ext. 4609.
Materials Division Director: Isaac Q. Lord, Ext. 4494.
Information Officer: Larry Beller, Ext. 4880.

ECONOMIC STABILIZATION AGENCY

Administrator: Eric Johnston, 811 Vermont Ave. N.W., Room 315, STerling 0167, Ext. 500.
Director of Information: Kenneth Clark, 811 Vermont Ave. N.W., Room 307, STerling 0167, Ext. 970.

Wage Stabilization Board

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Executive Assistant: Thomas Klechak, S-309 E, Ext. 4318.
Chief Counsel: Harold Leventhal, S-318 E, Ext. 2594.
Director, Office of Price Operations: Edward F. Phelps Jr., S-204 E, Ext. 2568.
Assistant Director, For Public Information: Max R. Hall, H-271 E, Ext. 3301. **Assistants:** Bainbridge Crist, 7-104 E, Ext. 5730; Lester S. Scott, 7-103 E, Ext. 3491.

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Assistant Director: John M. Bulkley, 2067 S, Ext. 3132.
Assistant Director: Sam Ewing, 2059 S, Ext. 4980.
Administrative Officer: W. F. Hagan, 1053 S, Ext. 6273.
Division Counsel: F. Stewart Stranahan, 2053 S, Ext. 4184.
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DEFENSE DEPARTMENT

The Pentagon—Liberty 5-6700
Col. George W. White is chief of the Industrial Services Branch, Office of Public Information, Office of Secretary of Defense.

organized to answer questions and clear requests of industry, and **Jay Cassino** is chief of the branch's Information Section. They are located in Room 2A858, The Pentagon. Extension for Col. White is 75881, for Mr. Cassino 75319.

Those wishing to contact personnel in the Munitions Board (the military policy coordinating agency) should see or telephone or write to the Public Relations Adviser to the Munitions Board, **Col. William Westlake**, 3E843 The Pentagon, Ext. 75361.

Small businessmen with problems that require help from the military should see, write or telephone the chief, Small Business Office, Munitions Board, who is **Richard Leuthan**, Room 3D758, The Pentagon, Ext. 71481.

For assistance in matters relating to procurement see the Central Military Procurement Information Office, Room 3D754, The Pentagon, Ext. 66151.

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General Counsel: E. Jason Dryer, Room 5451, Ext. 2698.

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Consultant: J. E. Moore, Room 5449, Ext. 3611.

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1901 Constitution Avenue, N.W. STerling 8000

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1300 E Street, N.W. EXecutive 6400

(In addition to conducting regular Coast Guard programs, the Coast Guard plays a leading role in shaping policies and conclusions of the Merchant Marine Council and the Ship Structure Committee)

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Commerce Bldg. STerling 9200

(Government agency for making available to the public technical information developed by the government)

Director: John C. Green, Room 1313, Ext. 2143.

NATIONAL INVENTORS' COUNCIL

Commerce Bldg. STerling 9200

(Encourages inventors to contribute ideas for defense)

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Assistant Chief Engineer: Leonard Hardland, Room 1319, Ext. 3311.

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Chief Information Officer: Lt. Col. Irving W. Hart, Room 509, Ext. 3675.

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1901 D Street, N.W. REpublic 3600

(State Department's agency for executing the Point Four program of technical assistance to foreign countries)

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Industry & Government Services Division Chief: George Tayloe Ross, Ext. 3109.

Director of Information: Benjamin Hardy, Ext. 3011.

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806 Connecticut Avenue N.W. STerling 6400

(Administering Marshall Plan economic assistance to Western Europe, and economic assistance to Southeast Asia)

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Projects Branch Chief (handling plant expansion and equipment programs involving $1 million or more): George H. Knutson, Ext. 2788.

Farm Machinery Branch Chief: William R. Nolan, Ext. 2541.

Iron & Steel Branch Chief: C. G. McNaron, Ext. 2633.

Nonferrous Metals Branch Chief: Ralph L. Wilcox, Ext. 3100.

Director of Information: Robert R. Mullen, Ext. 2627.

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Commissioner of Federal Supply Service: Clifton E. Mack, Ext. 5268, Room 3143.

Director of Information: Joseph S. Cohen, Ext. 4511, Room 6113.

Deputy Director of Information: Herbert C. Plummer, Ext. 4511, Room 6113.

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GSA Bldg. EXecutive 4900

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Deputy Administrator: Howard I. Young, Ext. 4312, Room 6137.

Information Officers: Joseph S. Cohen and Herbert C. Plummer, Ext. 4511, Room 6113.

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(In process of being reorganized, with transfer of principal functions to the new Defense Materials Procurement Agency, listed above. The following three divisions probably will be shifted intact to the DMPA)

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Director: Tom Lyon, Ext. 3433, Room 3612.

Lead & Zinc Branch Chief: Thomas Billings, Ext. 5226, Room 3618.

Light Metals Branch Chief: Howard L. Heckman, Ext. 4409, Room 3626.

Minor & Rare Metals Branch Chief: W. Bourret, Ext. 3318, Room 2616.

Iron Ore Branch Chief: Paul E. Pesonen, Ext. 6024, Room 1039.

Copper Branch Chief: J. B. Gowen, Ext. 2574, Room 2612.

Ferroalloys Branch Chief: George B. Holderer, Ext. 2376, Room 3624.

DMA Requirements Division

Acting Director: Francis B. Speaker, Ext. 3038, Room 2465.

Manpower Branch Chief: Stephen Wood, Ext. 4772, Room 2465.

Housing & Utilities Branch Chief: Stanley M. Walker, Ext. 2670, Room 2465.

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(Responsible for arranging contracts for minerals production expansion)

Director: C. Otto Mittendorf, Ext. 5371, Room 4640.

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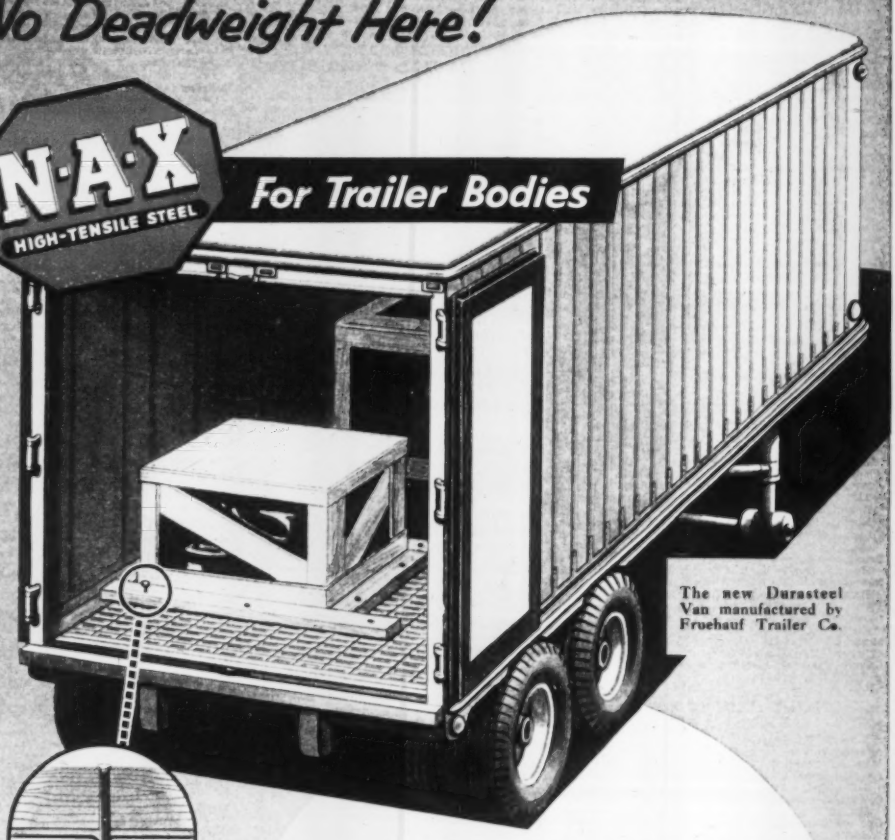

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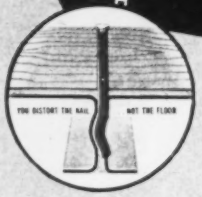

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NATIONAL STEEL CORPORATION

By H. C. TUTTLE *Detroit Editor*

Mirrors of Motordom

Auto makers beat the bushes for materials which are so short that they may be able to build only 850,000-900,000 cars in the fourth quarter

DETROIT

THIS IS the quarter when in theory at least automobile and other consumer durable goods manufacturers start enjoying the benefits of the Controlled Materials Plan.

Against it from the start, many automobile makers are seeing their worst fears realized as the industry's allocations of steel, copper and aluminum are whittled back more and more and difficulties continue in getting honored what CMP tickets they do have.

Brainwork—So, automotive purchasing agents are working overtime on ways to get more material. One story had it that General Motors was in a scheme to trade Korean battlefield scrap with Japanese steel mills for finished steel. GM says that's "absolutely without foundation." But many deals really have been worked out. One of the biggest is the agreement by Chrysler and Packard to lend money to Pittsburgh Steel in trade for steel. GM had already done that with J & L and Republic. Conversion activity is markedly increasing, and there has been an unusual amount of interchange of finished steel products among automotive companies. That interchange figures in the changed relationship whereby Kaiser-Frazer becomes a supplier for Fisher Body.

Auto builders are working the hardest to get foreign steel, copper and aluminum because whatever material they can bring in is not chargeable against CMP allocations. Studebaker Corp. is an active importer. Harold S. Vance, chairman and president, points out that the tonnage being received from Belgium mills is by no means tremendous. It won't assure uninterrupted civilian production and employment, but it'll help. "The importation of steel is, of course, an expensive proposition," he admits. "It is at the same time a good example of the extent to which industry will go toward preserving jobs, satisfying the needs of the customers and serving the best interests of the dealers."

Aid to Suppliers—The story of how Studebaker lined up this material is an interesting one, and one which other automakers are trying hard to duplicate. Some months ago officials of the No. 4 auto maker realized they would have to beat some other bushes (the domestic ones were already well trampled) in the search for steel. So Studebaker's one-time director of purchases and now vice president in charge of manufacturing, P. O. Peterson, and company treasurer E. E. Richards, equipped, we presume, with a checkbook, embarked for Europe. In Belgium they found what they were after: Several mills agreed to supply them with forging billets, both alloy and carbon. That material is now arriving regularly in New York from Antwerp. From dockside it fans out in many directions to the manufacturers of Studebaker crankshafts, connecting rods and steering knuckles.

Helpful as such steel is, it is not available in large enough quantities to make much of a difference in the production outlook of Studebaker or any other car maker. A few companies seem to have their steel problems fairly well in hand for fourth quarter. Those however, are in the minority.

STUDEBAKER: ACTIVE IMPORTER OF FOREIGN STEEL

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Trouble for All—For all, furthermore, it's going to be touch-and-go on copper. Some have said that their per-unit consumption is already at a minimum, and this situation gives rise to the prevalent feeling in Detroit that some relief must be given to copper users if auto production is to maintain somewhere near its present rate. Instead of a little in excess of one million cars in fourth quarter, some sources indicate that 850,000-900,000 is a more realistic figure. In making that prediction they think

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that materials, not customers, will be the limiting factor.

Sales Surpass Production

Sales reports by various of the largest car makers indicate that the turnout of passenger cars already is behind demand and that it is a question of only a short time before dealers' stocks are cleaned out. In the case of Chrysler Division, President David A. Wallace recently reported that the division has 25,000 unfilled orders for cars equipped with its V-8 engine and that sales match production. If the present rate of production can be maintained the number of eight-cylinder cars shipped by the division this year will equal 1949 and 1950's combined output of eights.

The corporation, to prevent overbuilding against its third quarter quota established by NPA's order M-68, closed its divisions down last week for several days and used the downtime to take inventory. GM interrupted production at the end of July for the same reason.

Bad News About Alloys

The industry's metallurgists heard bad news when Ernie Hergenroether spoke before the SAE Iron & Steel Technical Committee meeting last week.

Mr. Hergenroether, metallurgist with International Nickel Co., is currently doing a stint with NPA in charge of metallurgy and conservation in the Iron & Steel Division. Repeatedly he said: "If you want to build your units you had best find the leanest alloys you can. We can't give you something we haven't got." Running through a list of the alloying elements, he indicated that nearly all will be in tighter supply before they loosen. Apparent demand for nickel and molybdenum is about two and a half times available supply, and moly may tighten even further. Even chromium may come into shorter supply but it may not be necessary to allocate. Although increase in nickel output is not on schedule, by the middle of next year the Cuban operation will become a factor and by late in 1952 new Canadian sources are expected to come in.

Auto, Truck Output

U. S. and Canada

	1951	1950
January	645,688	609,879
February	658,918	505,593
March	802,737	610,680
April	680,281	585,705
May	695,898	732,161
June	653,682	897,853
Six Mos.	4,137,204	3,941,878
July	522,853	746,801
August	570,597*	842,335
September	494,810*	760,847
October		796,010
November		833,784
December		671,622
Week Ended	1951	1950
Sept. 1	137,479	188,072
Sept. 8	103,224	151,606
Sept. 15	136,150	185,421
Sept. 22	135,436	188,451
Sept. 29	120,000*	187,030

Sources: Automobile Manufacturers Association, Ward's Automotive Reports. *Preliminary.

He suggested that it may be possible for alloy users to reduce their requirements by as much as 50-75 per cent with the lean-alloy boron-treated steels. More of those are becoming available, he said, with 25,000 tons on the August melt schedule, 37,000 tons in the September schedule, and probably more for October.

Among his listeners were a few men who complained that they still have been unable to get certain of the boron-bearing grades for testing. He advised that companies in this plight should write him, and representatives of mills there promised that they would make available samples of the boron grades they are producing.

One of the most worrisome problems of alloy steel producers, expressed at the meeting, is over the failure of users to segregate properly their alloy-bearing scrap. Fifty per cent of their alloy requirements are supposed to come from scrap, but unless users can be convinced of the necessity of this reclamation work the mills will ultimately be unable to keep production of alloy steels at present levels.

Arsenal Gets New Officers

Four Army officers have been brought into key positions at Detroit's ordnance tank-automotive center as part of the shake-up which has been in progress since Brig. Gen. David J. Crawford was relieved of his command and replaced by Brig. Gen. Carroll H. Deitrick.

Col. A. R. Cyr is designated executive officer, coming to the center from Frankford Arsenal where he had been executive officer and chief of the artillery ammunition department. New head of the Procurement Division is Col. H. G. Davisson who has been chief of procurement at Picatinny Arsenal. Col. Henry J. Katz is named fiscal director and chief of a new audit section. He had been executive officer of the Erie Proving Ground. Lt. Col. Vernon C. Rawls, assigned from the Judge Advocate General's office, is chief of the Legal Division.

Old Timers Hear Hoffman

Twelfth annual dinner meeting of the Automobile Old Timers takes on unusual significance this year. For one thing, it will be held in Detroit for the first time. For another its speaker is to be Paul G. Hoffman, the man who many auto men think would be the best equipped president this country could have. Mr. Hoffman, head of the Ford Foundation, former economic cooperation administrator, and ex-president of Studebaker, will be making his first major address since his return from a globe-circling tour taken to find out how the Ford Foundation can best help the peoples of the world and promote world peace.

The dinner on Oct. 4 is expected to attract automaking "greats" in larger quantity than any gathering in recent years. Citations of distinguished service will be presented to William B. Stout, famous automotive inventor, P. W. Litchfield, rubber pioneer and chairman of Goodyear Tire & Rubber, Wilbur Shaw, president of the Indianapolis motor speedway, Earle C. Anthony, one of earliest West Coast auto dealers, and William L. Mallon, past president of the National Automobile Dealers Association. Also participating in the program will be George W. Mason, president of the Automobile Manufacturers Association and of Nash-Kelvinator Corp., Alfred Reeves, advisory vice president of AMA, and J. E. Henry, president of the Automobile Old Timers.

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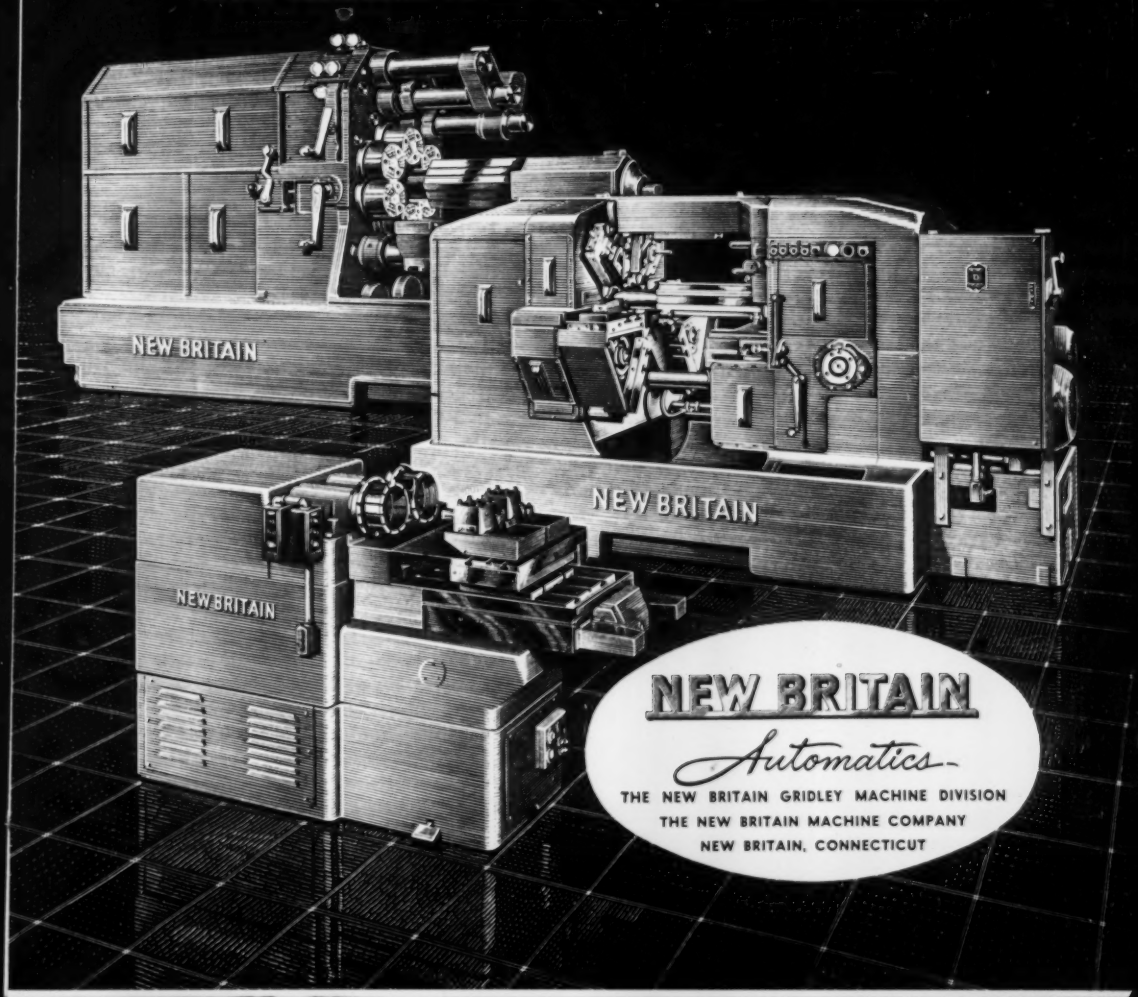

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SHARON STEEL CORPORATION

Sharon, Pennsylvania

DISTRICT SALES OFFICES: CHICAGO, ILL., CINCINNATI, O., CLEVELAND, O., DAYTON, O., DETROIT, MICH., INDIANAPOLIS, IND., MILWAUKEE, WIS., NEW YORK, N. Y., PHILADELPHIA, PENNA., ROCHESTER, N. Y., LOS ANGELES, CALIF., SAN FRANCISCO, CALIF., MONTREAL, QUE., TORONTO, ONT.

For information on Titanium Developments contact Mallory-Sharon Titanium Corp., Indianapolis 6

SHARONSTEEL

The Business Trend

There's plenty of support for a business pickup, but the rise is likely to be a gradual one. Industrial production index remains at status quo

BALANCED on a high plateau, the economy should make its decisive move upward soon.

Businessmen have waited patiently for a big surge in September—and it didn't develop. Scattered signs of an upswing are evident, but they indicate more of a gradual rise than a sudden spurt.

Government, industrial and consumer spending, so the economists say, will form the irresistible combination that'll not only shore up business against recession, but will push it ahead rapidly in the next few months. A strong push, of course, would be from the government. Its expenditures in each of the next four years will average over $75 billion, not counting a larger air force or foreign aid. About two-thirds of the money budgeted will be for arms—meaning a large slice for metalworking. Industrial capacity is still growing by leaps and bounds, though fourth-quarter plant expenditures will slide off a bit from July-September totals. Physical volume of plant-equipment buying this year will be 25 per cent higher than last and about one-sixth more than in 1948, the previous record year, says the Commerce Department. That estimate takes into account increases in costs this year too.

Production, though governed largely by the military timetable, still includes a high volume of civilian goods. Step-up this fall will see improvement in arms output without considerable sacrifice of less-essential products. The ratio didn't change much in the week ended Sept. 22, according to STEEL's industrial production index. It dropped off one point from the preceding week's mark to 216 per cent of the 1936-1939 average because of a slight dip in electric power output.

Slow Rise in Steel Rate . . .

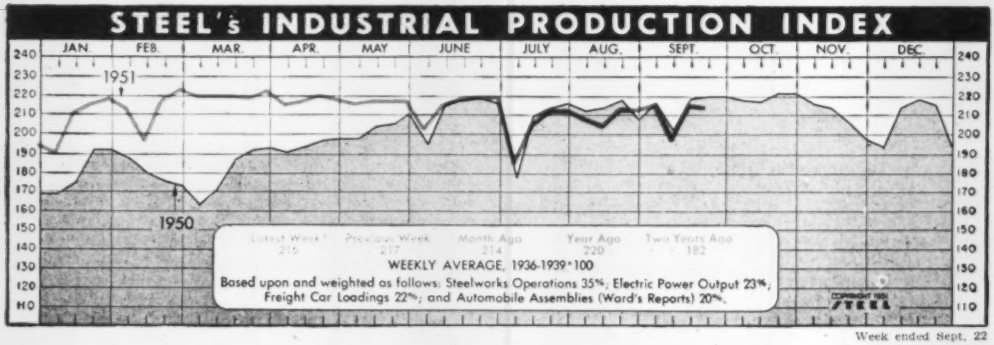
Highest production level in over a month was scheduled by the steel industry in the week ended Sept. 29. The American Iron & Steel Institute says mills would operate at above-capacity rates for the third consecutive week. Yield was calculated to be 2,041,000 net tons of ingots and steel for castings. This would be 18,000 tons more than were poured the week before, and 99,000 tons above production in the corresponding week a year ago. Winter cutbacks in production are already foreseen because of scrap shortages.

Auto Assemblies Steady . . .

Sticking close to assembly schedules, U. S. and Canadian plants turned out 135,436 passenger cars and trucks in the week ended Sept. 22. This was about 700 fewer units than were produced the week before and some 50,000 units below the level at this time last year. U. S. assemblies in September were estimated by *Ward's Automotive Reports* at 362,000 cars and 106,000 trucks. Both totals are near the projected volume, but compared to September, 1950, there were 40 per cent fewer autos and 2 per cent more trucks produced. Passenger car output thus far this year is trailing the 1950 pace by

BAROMETERS of BUSINESS

		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	101.0	100.0	98.0	101.0
	Electric Power Distributed (million kilowatt hours)	7,014	7,138	7,077	6,457
	Bituminous Coal Production (daily av.—1000 tons)	1,808	1,539	1,715	1,897
	Petroleum Production (daily av.—1000 bbl.)	6,290	6,282	6,220	5,894
	Construction Volume (ENR—Unit $1,000,000)	$232.4	$189.2	$188.9	$238.9
	Automobile and Truck Output (Ward's—number units)	135,436	136,150	138,797	188,451
	*Dates on request. †Weekly capacities, net tons: 1951, 1,999,035; 1st half 1950, 1,906,268; 2nd half 1950, 1,928,721.				
TRADE	Freight Car Loadings (unit—1000 cars)	855†	851	839	870
	Business Failures (Dun & Bradstreet, number)	160	164	130	155
	Currency in Circulation (in millions of dollars)‡	$28,140	$28,216	$27,932	$27,081
	Department Store Sales (changes from like wk. a yr. ago)‡	−10%	−2%	−4%	+17%
	†Preliminary. ‡Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$18,705	$14,918	$15,210	$18,555
	Federal Gross Debt (billions)	$256.8	$256.6	$256.4	$256.8
	Bond Volume, NYSE (millions)	$14.2	$16.4	$10.1	$20.4
	Stocks Sales, NYSE (thousands of shares)	10,180	10,929	6,103	9,901
	Loans and Investments (billions)†	$70.7	$70.4	$70.3	$68.9
	United States Gov't. Obligations Held (millions)†	$30,722	$30,768	$30,949	$34,840
	†Member banks, Federal Reserve System.				
PRICES	STEEL's Weighted Finished Steel Price Index††	171.92	171.92	171.92	156.99
	STEEL's Nonferrous Metal Price Index‡	224.6	224.6	224.6	217.2
	All Commodities†	176.7	176.9	176.7	170.3
	Metals and Metal Products†	189.4	188.2	188.1	177.1
	†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100. ††1935-1939=100.				


STEEL's INDUSTRIAL PRODUCTION INDEX
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1951
1950
Latest Week* 215
Previous Week 217
Month Ago 214
Year Ago 220
Two Years Ago 182
WEEKLY AVERAGE, 1936-1939=100
Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.
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Week ended Sept. 22

more than 630,000 units. Materials, not sales, continue to govern output.

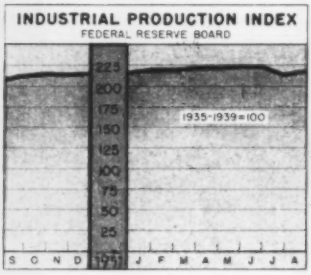
Car Loadings Hit '51 High . . .

Revenue freight car loadings, good indicator of transportation activity, were highest since last November in the week ended Sept. 15. The total of 850,813 loadings, while almost 2 per cent lower than in the corresponding week last year, showed the largest percentage jump in months. Preliminary reports indicate that revenue loadings for the rest of September were even higher. Freight car supply is expected to be rather tight in the peak loading period—October, but the railroads have about 34,000 more serviceable cars than a year earlier.

Retail Prospects Brighten . . .

Key to civilian production is retail sales. Consumers spent savings or borrowed money in the rush to buy goods following Korea and haven't bought much since. First it was the severity of the consumer slump that hurt business; now it's the duration.

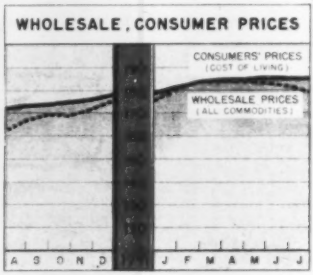
Retail business should shake off its pallor soon—if recent indications mean anything. Overbuying effects seem to be wearing off now, and prices aren't likely to fall much lower. Bank accounts that have been getting such devoted attention most of this year are swelling back to normal. Jobs are plentiful, pay is high, and disposable personal income this year will set a new record—even after the most crushing burden of taxes in history. Retailers are anticipating a more normal consumer spending rate: They're buying for inventory again. Volume of incoming orders has risen steadily but unspectacularly since early summer and bookings are now within 10 per cent of last fall's peak. August retail sales were 10 per cent higher than July's, but still 10 per cent below those of August.



Industrial Production Index

	Total Production 1951	Total Production 1950	Iron, Steel 1951	Iron, Steel 1950	Non-ferrous 1951	Non-ferrous 1950
Jan.	221	183	255	203	224	180
Feb.	221	180	252	201	275	190
Mar.	222	187	263	205	292	200
Apr.	223	190	264	222	210	198
May	223	195	263	226	266	197
June	222	199	261	231	265	207
July	213	196	254	228	261	202
Aug.	215	209		236		212
Sept.		211		245		216
Oct.		216		253		223
Nov.		214		247		227
Dec.		217		253		227
Avg.		200		229		207

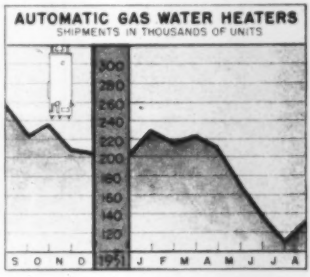
Federal Reserve Board



Price Indexes

	Wholesale (1926=100) 1951	Wholesale (1926=100) 1950	Consumers (1935-39=100) 1951	Consumers (1935-39=100) 1950
Jan.	180.1	151.5	181.5	168.2
Feb.	183.6	152.7	183.8	167.9
Mar.	184.0	152.7	184.5	168.4
Apr.	183.6	152.9	184.6	168.5
May	182.9	155.9	185.4	169.3
June	181.8	157.3	185.2	170.2
July	179.5	162.9	185.5	172.0
Aug.		166.4		173.4
Sept.		169.5		174.6
Oct.		169.1		175.6
Nov.		171.7		176.4
Dec.		175.3		178.8

U. S. Bureau of Labor Statistics



Automatic Gas Water Heaters

Shipments in Units

	1951	1950	1949
Jan.	225,600	131,600	88,400
Feb.	213,400	156,500	84,500
Mar.	223,300	172,900	106,000
Apr.	199,400	176,400	115,200
May	167,400	195,200	120,200
June	131,500	207,100	132,200
July	110,300	197,500	114,400
Aug.	132,300	259,800	138,800
Sept.		222,600	147,300
Oct.		235,100	154,200
Nov.		206,000	138,300
Dec.		202,500	126,500
Total		2,363,100	1,466,000

Gas Appliance Mfrs. Assoc.

Charts—Copyright 1951, STEEL

1950. In the first half of September seasonal promotions spurred total retail trade to match dollar volume of the comparative year-ago period, but actual physical volume was about 8 per cent less. Nondurables bettered their position noticeably and durables improved slightly.

Heating Equipment Wilts . . .

Shipments of gas-fired central heating equipment (boilers, furnaces and conversion burners) for the first eight months of the year are 42 per cent behind those of last year. August shipments of 52,400 units brought the eight-month total to only 389,300. This figure, small as compared to last year's record, is still almost ten times the pre-war average shipments of this equipment.

More Steelworkers . . .

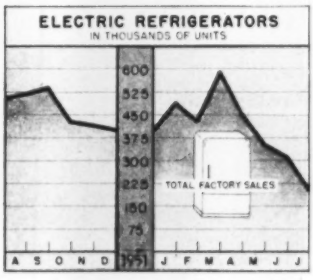
The iron and steel industry employed 4000 more people in July than in June, American Iron & Steel Institute reports. Employment was a record 678,200 persons, 35,000 more than a year ago. Though July payroll dropped almost $9 million, the seven months' payroll of $1.6 billion exceeded the payroll for all of 1946 and was 25 per cent higher than in the first seven months of 1950. Average hourly wages rose to $1.955 in July, highest this year and 21.1 cents higher than in July, 1950. Wage earners worked 3.2 hours less in July than in June.

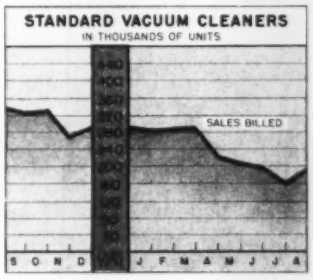
Trends Fore and Aft . . .

Defense Production Administration, worried about half-throttle operations of radio-television plants, is trying to place additional electronics orders with that industry . . . More people saved more money last year than in 1949, says the Federal Reserve Board. Income exceeded expenditures for 61 per cent of all spending units, expenditures topped income for 32 per cent, and 7 per cent broke even . . . After a two-month decline, business failures turned up 2 per cent in August to 678. The casualty rate, seasonally adjusted, stood at 33 failures per 10,000 enterprises.

Issue Dates of other FACTS and FIGURES Published by STEEL:

Construction Sept.24	Furnaces, W. Air..Sept.17	Radio, TV Aug.20
Durable Goods Aug.6	Gear Sales Sept.17	Ranges, Elec. Sept.24
Employ., Metalwk. July16	Gray Iron Castings Sept.10	Ranges, Gas Sept.24
Employ., Steel Aug.27	Ironers Sept.17	Steel Castings Sept.10
Fab. Struc. Steel...Sept.10	Machine Tools Sept.10	Steel Forgings Aug.20
Foundry Equip. ...Sept.24	Malleable Castings..Sept.10	Steel Shipments ...Aug.27
Freight Cars Sept.24	Pumps, New Orders. July9	Wages, Metalwkg...Aug.13
Furnaces, Indus. ..Sept.17	Purchasing Power...Sept.3	Washers Sept.17





Electric Refrigerators
Total Factory Sales—Units

	1951	1950	1949
Jan.	488,607	375,856	396,329
Feb.	423,420	461,256	348,539
Mar.	591,449	586,293	382,861
Apr.	445,636	546,279	335,092
May	548,423	542,865	341,933
June	309,125	549,740	316,780
July	199,616	507,029	327,429
Aug.		518,359	314,839
Sept.		535,092	326,149
Oct.		420,431	265,575
Nov.		411,201	230,258
Dec.		394,268	272,636
Total		5,818,579	3,852,420

National Electrical Mfrs. Assoc.

Standard Vacuum Cleaners
Sales Billed—Units

	1951	1950	1949
Jan.	282,305	249,150	228,769
Feb.	261,572	263,515	241,267
Mar.	290,242	361,014	309,897
Apr.	227,216	292,664	252,656
May	201,983	278,645	222,856
June	194,548	250,190	207,354
July	161,092	279,967	161,920
Aug.	191,299	341,232	219,969
Sept.		327,524	250,036
Oct.		331,445	272,520
Nov.		265,310	253,516
Dec.		288,756	265,513
Total		3,529,412	2,886,514

Vacuum Cleaner Mfrs. Assn.

SAVE STOCKROOM TIME

Requisitions to your stockroom for Pheoll Fasteners can be filled in less time. Boxes, bags and packages are plainly marked with sizes clearly indicated for rapid identification. Pheoll's quality products handle easily, can be quickly counted or transferred to bins or assembly line trucks.

REDUCE ASSEMBLY TIME

Workmen gain time assembling with Pheoll screws, bolts, and nuts because they are accurately threaded, drive easily, seat rapidly, grip tighter—assuring stronger assemblies, easier inspection and less rejects.

IMPROVE YOUR PRODUCT APPEARANCE

The uniform quality of Pheoll Fasteners improves your product appearance. Precision slotted and finished heads, cleanly chamfered nuts, prevent marred surfaces and add to your product's sales appeal. Write for Pheoll literature and price list.

Save Costs...Increase Profits with these Pheoll Fasteners

ASK ABOUT PHEOLL Machine Screws† Machine Bolts • Special Screws and Bolts Cap Screws • Machine Screw Nuts • Wood Screws† • Thumb Screws • Brass Washers Stove Bolts†

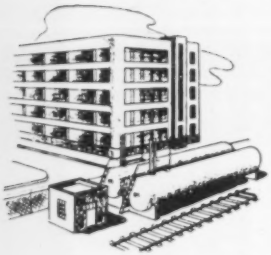
†Furnished in slotted and Phillips Recessed Head Types

Pheoll
MANUFACTURING COMPANY
5700 ROOSEVELT ROAD
CHICAGO 50, ILLINOIS
SCREWS • BOLTS • NUTS
Industrial Fasteners and Holding Devices

Philgas*

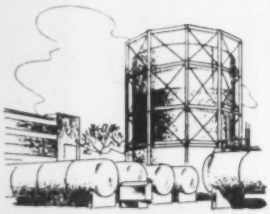
...A Superior LP-Gas Proven in Service

FOR INDUSTRIES



Leading industries use Phillips *66* Philgas successfully for heat treating, mold drying, core baking, ceramic firing and many, many other operations. Automatic Philgas systems assure constant furnace temperatures and atmospheres; constant pressures, high or low.

FOR UTILITIES



Many progressive utilities use Phillips *66* Philgas to augment natural or manufactured gas. High-quality Philgas is uniform in thermal value and gravity, and is free from harmful contaminants. Automatic operation cuts down on overhead.

*Philgas is the Phillips Petroleum Company brand name for its high quality propane-butane LP-Gas or bottle gas.

Phillips 66

PHILLIPS PETROLEUM COMPANY

Sales Department — Bartlesville, Oklahoma

Offices located in Amarillo, Tex., Atlanta, Ga., Chicago, Ill., Denver, Colo., Des Moines, Ia., Pontiac, Mich., Indianapolis, Ind., Kansas City, Mo., Milwaukee, Wis., Minneapolis, Minn., New York, N. Y., Omaha, Nebr., Raleigh, N. C., St. Louis, Mo., Tulsa, Okla., Wichita, Kan.

Men of Industry

WARDEN F. WILSON
. . . Donegal Mfg. president-gen. mgr.

JOHN F. SPAULDING
. . . Black & Decker sales mgr.

LAWRENCE WILKINSON
. . . a V. P. of Continental Can

Warden F. Wilson was elected president, general manager and a director of **Donegal Mfg. Corp.**, Marietta, Pa. Formerly general sales manager of Lebanon Steel Foundry, he has been active for a number of years in the institution of research and product development activities.

W. R. Meikle has joined **National Radiator Co.**, Johnstown, Pa., to be in charge of the heavy steel defense production of its steel boiler plant at Middletown, Pa. He was vice president, Viking Instrument Co., and from 1940 to 1948 was production manager in the steel boiler department of Burnham Corp.

Emmett G. Gardner has joined **Bostitch Inc.**, Westerly, R. I., as executive vice president. He formerly was executive vice president of Nesco Inc. The company elected as vice presidents **John E. Scully**, in charge of finance; **Kenneth E. Joy**, in charge of sales; and **John B. Wynne**, in charge of production.

W. Cordes Snyder Jr., vice president of Koppers Co. Inc. and manager of its metallurgical department, joins **Blaw-Knox Co.**, Pittsburgh, on or about Nov. 1 as president and chief executive officer. He previously was a vice president of Blaw-Knox and manager of its Lewis Foundry & Machine Division.

Frederic B. Powers was elected president of **Rawlplug Co. Inc.**, New York. He succeeds the late **Winthrop R. Howard**, founder and president of Rawlplug since its inception in 1921. Mr. Powers was vice president and secretary, and also a director.

John F. Spaulding was appointed sales manager of **Black & Decker Mfg. Co.**, Towson, Md. He joined the company in 1926. Since 1931 he has been manager of the Buffalo branch. Mr. Spaulding succeeds **Glen H. Treslar**, recently promoted to vice president in charge of sales.

R. L. Logue was appointed chief body engineer, and **D. H. Tillotson**, chief engine and chassis engineer at **Kaiser-Frazer Corp.**, Willow Run, Mich. Mr. Logue was production engineer and Mr. Tillotson, chief draftsman.

Mel E. Maurer was elected vice president in charge of manufacturing for **Nesco Inc.**, Chicago. He will direct all manufacturing, purchasing and engineering. Previously Mr. Maurer was manager of manufacturing-engineering for Hotpoint Inc. for four years, and before that was assistant works manager, Lockheed Aircraft.

MEL E. MAURER
V. P.-mfg. at Nesco

Continental Can Co., New York, elected **Lawrence Wilkinson** a vice president. He resigned his post as director of the New York Civil Defense Commission to accept the post at Continental, where he will be assistant to the chairman of the board.

J. Peter Brehm was named district sales representative in the San Francisco area for Woven Wire Fabrics Division, **John A. Roebling's Sons Co.** He was a member of the division's Los Angeles sales force.

Kenneth E. Reynolds was appointed head of a new defense contract department established by **Bausch & Lomb Optical Co.**, Rochester, N. Y. He is succeeded by **Herbert J. Mossien** as head of the analytical instrument sales department. **William R. Saunders** takes over Mr. Mossien's position of assistant head of the company's educational sales department.

Harry F. Allen joined the sales force of **Hanson-Van Winkle-Munning Co.**, Matawan, N. J. He will have headquarters in Cleveland.

Kaiser Aluminum & Chemical Corp., Oakland, Calif., elected **Edgar F. Kaiser** a member of the board of directors, and **William P. B. Marks**, vice president and secretary. They fill vacancies created by the death of **G. G. Sherwood**. Mr. Kaiser is president of Kaiser-Frazer Corp. Mr. Marks is vice president in charge of the legal department of Henry J. Kaiser Co.

Sven Vaule, consulting management engineer, who temporarily discontinued practice in 1949 to become

works manager at **Saco-Lowell Shops'** Biddeford, Me., plant, is resuming general practice. His office will be at One Mitchell Rd., South Portland, Me.

Ray Smith, metallurgist, joined the sales staff of **KSM Products Inc.,** Merchantville, N. J., as junior engineer. He will receive in-plant training before being assigned to a sales district. Mr. Smith formerly was with Joseph T. Ryerson & Son.

James A. Crooks was named manager of commercial research, **Bethlehem Pacific Coast Steel Corp.,** San Francisco. He succeeds **O. P. Walker,** resigned.

Henry Collins was appointed office manager of **Arthur Colton Co.'s** new plant in Paducah, Ky. The Colton company is a division of Snyder Tool & Engineering Co. Its Paducah plant was formerly Ace Mfg. Co., and has been specially re-equipped for production of precision punches and dies.

Charles E. Wilson, sales vice president, **Worthington Pump & Machinery Corp.,** Harrison, N. J., will retire from that position Oct. 1 but will continue in a consulting capacity on sales problems at Worthington's offices in Los Angeles, San Francisco, Seattle and Salt Lake City.

Luria Bros. & Co. Inc., Philadelphia, elected **Joel Claster** president to succeed the late **A. L. Luria. Ralph E. Ablon** was named executive vice president and **D. Hays Solis-Cohen** was added to the board of directors. **Herbert L. Luria** continues as treasurer. Mr. Claster, formerly executive vice president, joined Luria Bros. in 1919, and Mr. Ablon, formerly vice president, joined the firm in 1939. D. Hays Solis-Cohen is a partner in the law firm of Wolf, Block, Schorr & Solis-Cohen, Philadelphia.

JOEL CLASTER
new president of Luria Bros.

CLYDE WILLIAMS
. . . new V. P. of Temco

Texas Engineering & Mfg. Co., Dallas, elected **Clyde Williams** vice president-comptroller, and **John A. Maxwell Jr.,** vice president - manufacturing. Mr. Williams was secretary and assistant treasurer, and Mr. Maxwell continues as works manager.

Richard A. Flinn, assistant chief metallurgist in **American Brake Shoe Co.'s** research and development center, will accept an associate professorship of product engineering and metallurgical engineering at the University of Michigan. He will also be in charge of the university's experimental foundry. Mr. Flinn will leave American Brake Shoe near the end of this year, but it is expected he will retain connections with the company as a consultant.

David J. Gemmell has joined **Hodell Chain Co.,** division of National Screw & Mfg. Co., as assistant to the president. He will have headquarters at the company's Cleveland offices and will also work with other cities in developing sales to hardware and mill supply distributors. He had been with Cleveland Chain & Mfg. Co. from

RALPH E. ABLON
. . . exec. V. P. of Luria Bros.

JOHN A. MAXWELL JR.
. . . new V. P. at Temco

1929 until he resigned recently as executive vice president and director of sales.

Dr. W. C. Rueckel has joined the staff of **Kaiser Engineers Division,** Henry J. Kaiser Co., with offices in Oakland, Calif. He will be manager of the chemical division. Dr. Rueckel is a former vice president of Koppers Co. in the engineering and construction division.

Arthur N. Dugan, vice president, **National Bearing Division,** American Brake Shoe Co., New York, has retired after 37 years' service, but will continue his connection with the company as a consultant. **Pearce D. Smith,** sales representative for National Bearing, has transferred from Pittsburgh to company headquarters in New York.

J. W. Gooch was appointed assistant plant manager in charge of manufacturing operations in production of band tools for **DoAll Co.,** Des Plaines, Ill. He was with DoAll from 1940 to 1948 as general manager in charge of saw manufacturing. Since then he has been with Leader Electric Co.

Martin L. Killgallon, superintendent of Division I of **Oliver Iron & Steel Corp.,** Pittsburgh, was named plant manager of the Berry Division in Corinth, Miss. **William N. Boyd** becomes superintendent of Division I and **Walter Most,** acting superintendent of Division II.

Harold C. Weingartner, chief engineer, was elected vice president and general manager of the equipment division of **National Research Corp.,** Cambridge, Mass.

Allegheny Ludlum Steel Corp., Pittsburgh, appointed **John E. Groves** director of industrial relations and

Ever see such a fast-moving assembly line?

It is amazing how fast the automotive industry has moved.

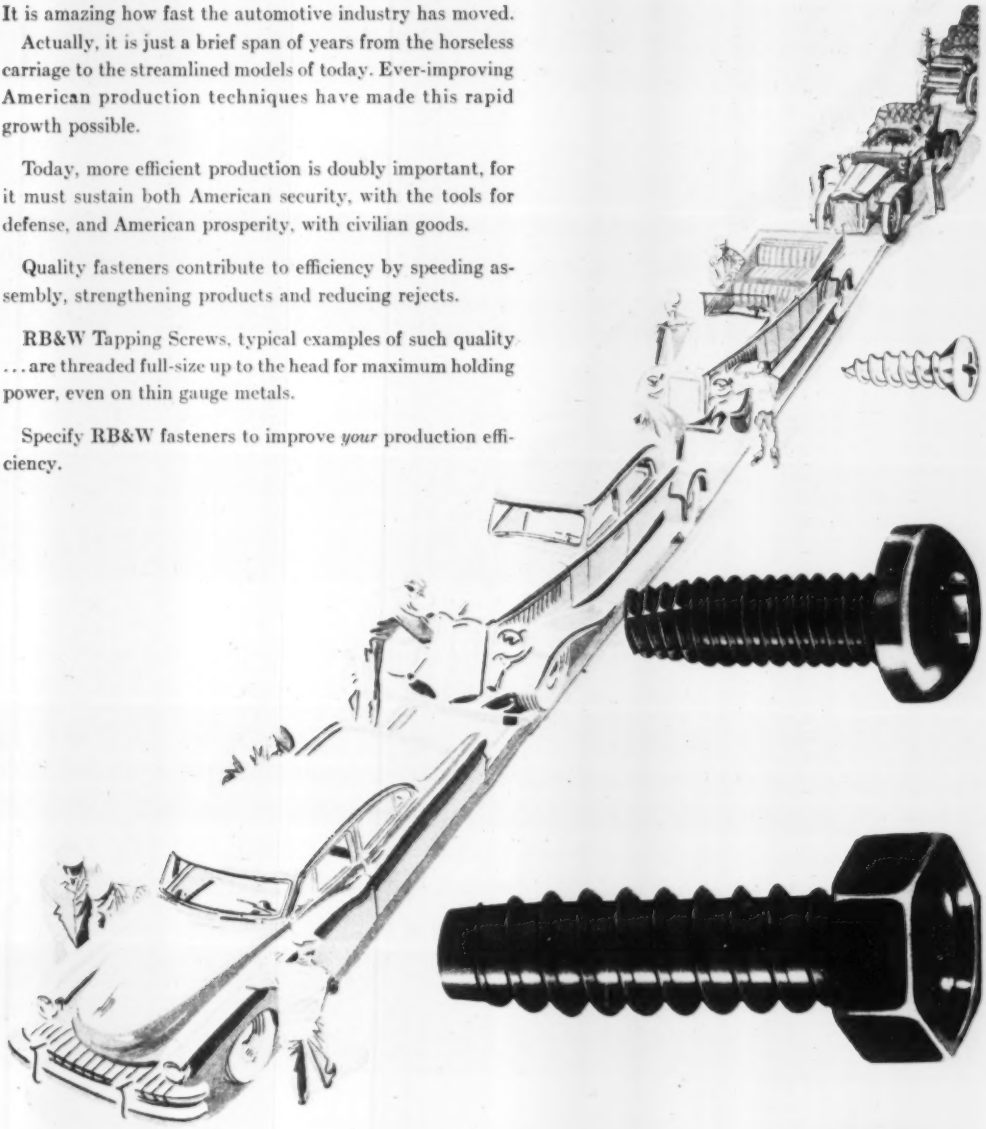
Actually, it is just a brief span of years from the horseless carriage to the streamlined models of today. Ever-improving American production techniques have made this rapid growth possible.

Today, more efficient production is doubly important, for it must sustain both American security, with the tools for defense, and American prosperity, with civilian goods.

Quality fasteners contribute to efficiency by speeding assembly, strengthening products and reducing rejects.

RB&W Tapping Screws, typical examples of such quality ... are threaded full-size up to the head for maximum holding power, even on thin gauge metals.

Specify RB&W fasteners to improve *your* production efficiency.



RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

RB&W THE COMPLETE QUALITY LINE

Plants at: Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill., Los Angeles, Calif. Additional sales offices at: Philadelphia, Detroit, Chicago, Dallas, Oakland. Sales agents at: Portland, Seattle.

106 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG

RAYMOND T. JOYCE
. . . manages Brooks Oil operations

CHESTER W. BRUCE
. . . Republic's chief engineer at Chicago

WILBUR E. LUNGER
. . . elected a V. P. of A.C.F.

Ralph L. Ostrander, manager of labor relations. Both will have headquarters at the general offices at Brackenridge, Pa.

Brooks Oil Co. of Cleveland and Pittsburgh appointed **Raymond T. Joyce** manager of operations. He also is secretary. Mr. Joyce has been with Brooks Oil since 1934. In 1940 he became purchasing agent, and was elected secretary in 1946. In addition to his duties as manager of operations and secretary, Mr. Joyce will serve as chairman of the plant planning committee and the pension fund committee.

Richard L. Bean was appointed publicity manager, **Lockheed Aircraft Corp.,** Burbank, Calif. He replaces **Ned Root,** now affiliated with Consolidated Vultee.

J. George Eichhorn was appointed personnel director of **Automatic Transportation Co.,** Chicago.

Stanley B. Elliott was appointed vice president and general manager of **Ferro Chemical Corp.,** Cleveland.

Chester W. Bruce was appointed chief engineer for the Chicago district of **Republic Steel Corp.** He succeeds **Alvin A. Claassen,** retired after 34 years' service with the company. **Harold E. Berg** succeeds Mr. Bruce as assistant chief engineer.

H. L. Larrimore is retiring Oct. 1 as manager of inside sales, **Bliss & Laughlin Inc.,** Harvey, Ill. He will be replaced by **Roy A. Peffers,** assistant manager of inside sales, whose position will be filled by **John B. Showalter.**

Kenneth H. Gayle Jr., former vice president in charge of sales, **Ingalls Iron Works Co.,** Birmingham, was elected president, a director and chief executive officer.

Bjarne Klaussen was elected executive vice president, **Hooker Electrochemical Co.,** Niagara Falls, N. Y. **Donald E. Springer** was appointed chief engineer, effective Oct. 1. Mr. Klaussen has been with the company since 1916 and has been vice president in charge of production of all Hooker plants since 1947.

Wilbur E. Lunger was elected a vice president, **American Car & Foundry Co.,** New York, reporting to **R. W. Ward,** vice president in charge of production. Mr. Lunger was formerly assistant vice president in the production department.

G. E. Savage was named assistant superintendent, Youngstown plant protection department, **Republic Steel Corp.**

George E. Parker was elected president and chief executive officer of **Columbia Steel & Shafting Co.,** Carnegie, Pa. He succeeds **E. L. Parker,** who resigned as president and was elected chairman of the board. George Parker has spent his entire business career with Columbia and its subsidiaries. Since 1947 he has been vice president in charge of operations of the Columbia plant at Carnegie.

Ross H. Schroeder was named manager of **Packard Motor Car Co.'s** business management department, Detroit, to succeed **John W. Raisbeck,** who assumes new responsiblities in Packard's defense program.

OBITUARIES...

Ben Readman, advertising manager, **Vickers Inc.,** Detroit, died Sept. 23 following a heart attack.

Victor A. Menaglia, 57, for the last 25 years district manager for **SKF Industries Inc.,** Pittsburgh, died Sept. 10 following a heart attack.

Charles S. Amadon, owner and general manager of **Connecticut Broach & Machine Co.,** New London, Conn., died recently.

Daniel H. Slonaker, 78, former president and general manager, **National Roll & Foundry Co.,** Avonmore, Pa., died Sept. 18. He had retired in 1942.

George E. Griffith, 70, retired general traffic manager, **Carborundum Co.,** Niagara Falls, N. Y., died Sept. 16.

John P. Roberts, 43, assistant general manager, service sales division, **Timken Roller Bearing Co.,** Canton, O., was killed in an automobile accident near Spruce Pine, N. C.

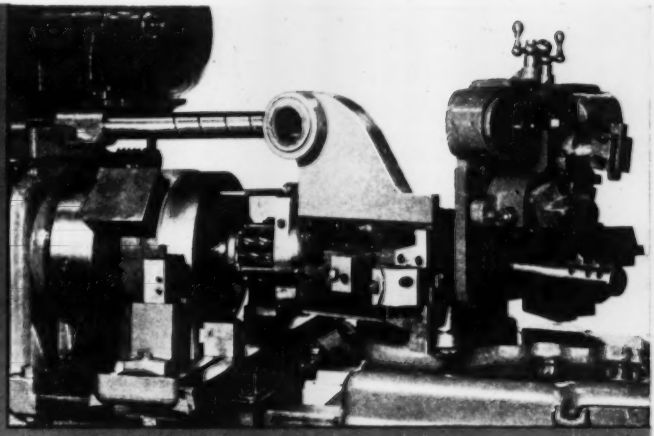
C. L. Best, 73, chairman of the board and member of the executive committee, **Caterpillar Tractor Co.,** Peoria, Ill., died Sept. 22 in San Francisco. Mr. Best was one of the founders of the company.

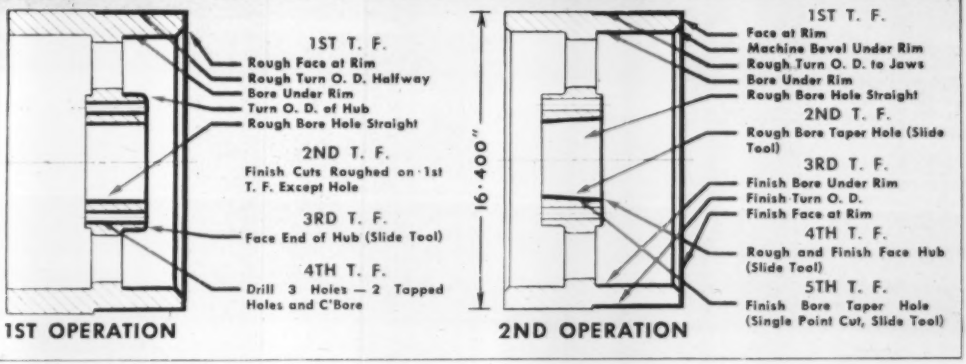
Guy E. Rogers, manager of standard building sales, **Blaw-Knox Division,** Blaw-Knox Co., Pittsburgh, died of a heart attack at Dundalk, Md.

Newlin T. Booth, 64, president of **Deemer Steel Casting Co.,** New Castle, Del., died Sept. 19.

William J. Todhunter, 77, former general superintendent of the rolling mill, South Chicago Works, United States Steel Co., and later superintendent of Inland Steel Co. at Indiana Harbor, Ind., died Sept. 9 in Australia where he went in 1922 as general superintendent of **Broken Hill Proprietary Co.** He retired two year ago.

QUALITY CONTROL IN QUANTITY PRODUCTION BEST ACHIEVED WITH P & J CARBIDE TOOLING SET UP ON THE P&J 5DE AUTOMATIC




1ST T. F.
Rough Face at Rim
Rough Turn O. D. Halfway
Bore Under Rim
Turn O. D. of Hub
Rough Bore Hole Straight
2ND T. F.
Finish Cuts Roughed on 1st T. F. Except Hole
3RD T. F.
Face End of Hub (Slide Tool)
4TH T. F.
Drill 3 Holes — 2 Tapped Holes and C'Bore
1ST OPERATION
16·400"
1ST T. F.
Face at Rim
Machine Bevel Under Rim
Rough Turn O. D. to Jaws
Bore Under Rim
Rough Bore Hole Straight
2ND T. F.
Rough Bore Taper Hole (Slide Tool)
3RD T. F.
Finish Bore Under Rim
Finish Turn O. D.
Finish Face at Rim
4TH T. F.
Rough and Finish Face Hub (Slide Tool)
5TH T. F.
Finish Bore Taper Hole (Single Point Cut, Slide Tool)
2ND OPERATION

You should see it in operation — this typically efficient P&J high-speed method for machining Pulleys on a precision-production basis. The machine best fitted for the job is the P&J 5DE Power-Flex Automatic with its 17 inch swing over the cross-slide. The Tooling on its 5 turret faces and cross-slide consists mainly of P&J's *standard* turret tool units, augmented by P&J-designed slide tools for machining the hub ends and taper hole, and a P&J-designed multiple spindle drill head which is aligned automatically for the proper position of the 5 holes in the hub and which rotates with the work. The cycle of operations is fast and fully automatic . . . results in faster and better machining . . . to closer limits of accuracy . . . with fewer rejects . . . at a highly profitable rate of production.

Numerous similar examples of productivity with P&J Tooling on P&J Automatics are illustrated in this free Booklet. Write for your copy.

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PAWTUCKET, RHODE ISLAND, U. S. A.

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WHERE FAST PICK-UP *Ups* PROFITS

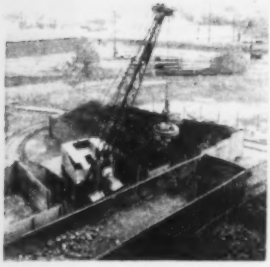
Fast circulation of scrap is paying a good return now! And at today's high prices, efficient and modern equipment raises the rate of return. The EC&M ALL-WELDED Lifting Magnet *sweeps clean* all incoming shipments, reduces baler charging-time with full lifts—and the EC&M Automatic-Discharge Controller cuts down the time between magnet trips. The adjustable feature gives fast, clean releases without waiting and with minimum spillage. *When buying electric cranes, it pays to specify both EC&M Control and Magnets.*

For COMPLETE FACTS—*Ask for No. 29 ACCELERATOR Bulletin*

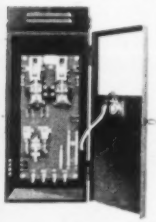
SAVES PREPARATION TIME—10-Ton Gantry Crane with EC&M Control and No. 6D EC&M ALL-WELDED Magnet.

HIGH TONNAGE OUTPUT—One of many overhead scrapyard cranes equipped with EC&M Crane Control and EC&M Magnets.

SCRAP GATHERED FAST with NEW EC&M Magnet on runabout cranes.



ALL-OUT! EC&M Magnet sweeps car bottoms clean—keeps material on the move.



Adjustable EC&M Controller *improves* magnet operation—for use with any make or size of magnet.

THE ELECTRIC CONTROLLER & MFG. CO.

2698 EAST 79TH STREET • CLEVELAND 4, OHIO

Production and Engineering NEWS AT A GLANCE

PLATING ECCENTRICITIES— Permeability or porosity of electrodeposits has become recognized as a disconcerting variable resulting in wide discrepancies in salt-spray and weathering tests of plated objects. Research Project No. 6 of the American Electroplaters' Society, aimed at the nature and effect of porosity in electrodeposits, has uncovered the variability factor and may further provide useful tools to increase the reproducibility and significance of salt-spray, outdoor exposure and other accelerated tests. Another vital AES project is No. 10 which is probing methods of disposal of plating room wastes. So far this work has concentrated on cyanide; shortly it will turn to the chromic wastes.

SO LONG, QUIZ KIDS—An "information searching machine" couples electronic principles of standard business machines with a new "language" of 792 characters, using photoelectric cells to read scientific information condensed on IBM cards, at a speed of 1000 cards a minute. A "question" card is placed in the machine which proceeds to scan the information cards, picking out those which give answers to the question or tell where answers may be found.

TOOL GALLING THE TROUBLE—Titanium alloys are proving to have a relatively low machinability rating, despite their many other attractive qualities. Rating B-1112 steel at 100, machinability of 18-8 stainless steel checks out at about 25, while titanium alloys run 15-20. Welding of chips to the cutting tool seems to be the explanation. Polishing or hard chrome plating of cutting tools, drills, taps and reamers will help. —p. 68

SEALED IN STEEL—Cans or "bathtubs" for shipping jet engines, while requiring substantial quantities of hot-rolled low-carbon steel plate, are figured to save the Air Force over $8 million annually by protecting the engines from damage in shipping and eliminating frequent inspections to guard against rust and corrosion when engines were packed in wood cases. The containers utilize rolled flanges and rubber O-ring seals, and are slightly pressurized. Engines are rubber mounted therein, can withstand total immersion in water or 36-inch drops with no damage.

STEP ON IT—AND BOUNCE—After complaints from machine operators that concrete floors were too slippery and hard on the feet, the management of an eastern plant decided to resurface the area with a new compound consisting of a water-setting cement to which is added about 10 per cent of neoprene latex. The composition was spread by trowel to a thickness of ¼-inch right over the old concrete and was ready for service in two days. After 2½ years of rough service the resilient floor still has good nonskid qualities, even where oil and water had been spilled. Workmen say they feel safer walking on the composition and do not suffer from tired feet at the end of the day. No wearing through, chipping, cracking or separation of the material, either.

QUENCHING AN EXACT SCIENCE— In determining the proper temperature for hot oil quenching, the metallurgist considering martempering as a means of reducing distortion in heat treated parts may be too prone to experiment with temperatures on the high side, thereby not realizing satisfactory hardness. A better approach is to start at around 200° F and progressively try higher temperatures to determine the maximum giving the required hardness, and then evaluating the reduction in distortion and residual stresses obtained. Good agitation of the quench is vital. —p. 64

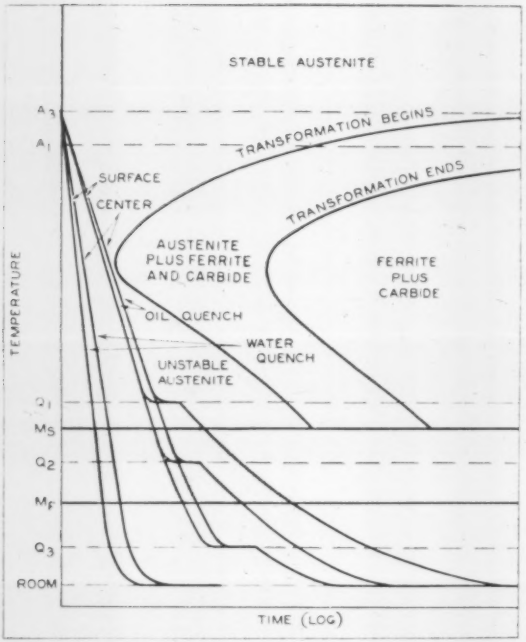
GRINDING OIL FOR BROACHING— In the early period of turbojet engine production, carbon tetrachloride was added to the sulphurized cutting oil used by some plants in broaching the fir-tree slots holding buckets in the high-alloy turbine disk or "hot wheel". The expedient was used to improve the finish on the slots which is extremely critical. However, carbon tet fumes set up a health hazard, the chemical is expensive and difficult to maintain because of rapid evaporation. A "hard" acting grinding oil with the maximum effective sulphur proved a better choice and no additive was required.

SOFTENING TO SAW—Friction sawing of many sizes of steel tubing can be carried out with ten times the speed of conventional or low-speed sawing. However, it is limited to certain wall thicknesses per given diameter. Principal of the friction band is similar to the dry abrasive cutoff wheel, both depending upon exceptionally high speed to generate heat to soften the material directly in front of the cutting edge. Friction sawing speeds range between 3000 and 10,000 fpm. —p. 70

NITROGEN TO SAVE NICKEL—An interesting sidelight on the element nitrogen in respect to its ability to promote austenite formation is pointed up by a leading metallurgical engineer. Advantage is taken of the fact to conserve nickel in the production of austenitic stainless steels. The addition of some manganese and nitrogen can save as much as 2-3 per cent nickel. Such steels have excellent strength for structural purposes. Recommended maximum nitrogen content is 0.10 per cent and while some mills are successful in using 0.15 per cent there is danger of gassy heats above this amount. A ferrochromium alloy containing nitrogen is used to make the addition. —A.H.A.

Metalworking Outlook—p. 27 Market Outlook—p. 139

HOT OIL QUENCHING **Expands Use**



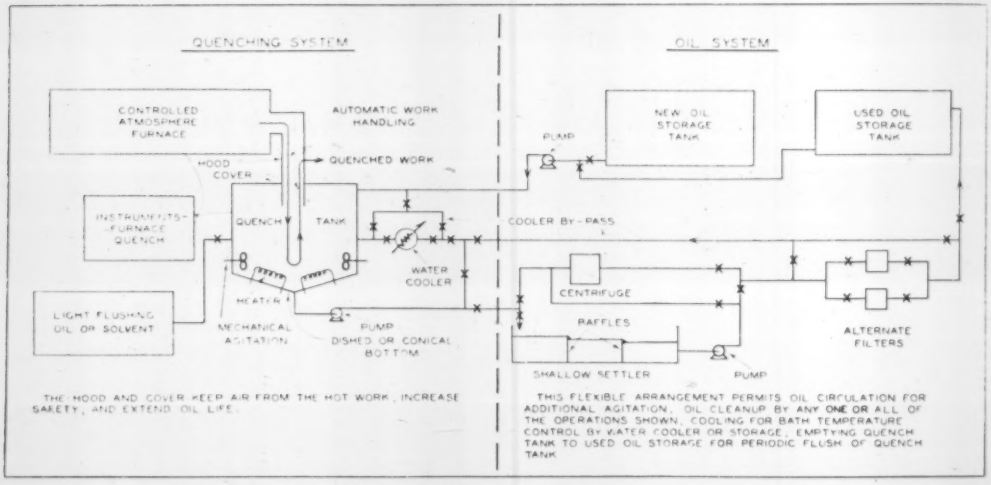
ONE of the most interesting methods of heat treating being presently used is a hot quenching process known as hot oil quenching or marquenching. The process involves quenching hot steel in mineral oil at 200-400°F, holding for temperature equalization and then cooling to ordinary temperatures, usually in air.

While present commercial use of hot oil quenching is limited primarily to the automotive, ball bearing and tool industries, it is expected that the use will spread in the near future to aeronautical and other industries. As a matter of economics, hot oil quenching is particularly important today because it makes possible some substitution of the more plentiful carbon steels for the relatively scarce high alloy steels.

Quenching Processes — Main types of quenching processes are conventional quenching and hot quenching. Conventional quenching involves rapid, continuous cooling to 60-120°F. Hot quenching, as usually applied, involves stopping the cooling at a tempera-

Fig. 1 (left)—Cooling curves for hot oil quenching. Curves for conventional water quenching are shown for comparison purposes

Fig. 2 (below)—Hot oil quenching system, one of the many possible variations in a well-appointed, continuous system. Equipment required depends on the exact service and installation size


QUENCHING SYSTEM
OIL SYSTEM
CONTROLLED ATMOSPHERE FURNACE
AUTOMATIC WORK HANDLING
HOOD COVER
QUENCHED WORK
INSTRUMENTS-FURNACE QUENCH
QUENCH TANK
HEATER
MECHANICAL AGITATION
PUMP DISHED OR CONICAL BOTTOM
LIGHT FLUSHING OIL OR SOLVENT
WATER COOLER
COOLER BY-PASS
PUMP
NEW OIL STORAGE TANK
USED OIL STORAGE TANK
CENTRIFUGE
BAFFLES
SHALLOW SETTLER
PUMP
ALTERNATE FILTERS
THE HOOD AND COVER KEEP AIR FROM THE HOT WORK, INCREASE SAFETY, AND EXTEND OIL LIFE.
THIS FLEXIBLE ARRANGEMENT PERMITS OIL CIRCULATION FOR ADDITIONAL AGITATION; OIL CLEANUP BY ANY ONE OR ALL OF THE OPERATIONS SHOWN; COOLING FOR BATH TEMPERATURE CONTROL BY WATER COOLER OR STORAGE; EMPTYING QUENCH TANK TO USED OIL STORAGE FOR PERIODIC FLUSH OF QUENCH TANK

# of Carbon Steels

By J. H. GREENE
Technical & Research Division
The Texas Co.
New York

ture in or above the martensite transformation range, which is lower than the temperatures at which austenite transforms to pearlite.

Transformation then occurs isothermally or during subsequent cooling, being determined by the holding time at quenching temperature before further cooling. Hot quenches are used where conventional quenches do not permit sufficient reduction in distortion and residual stresses or for obtaining steels of special properties. Martempering, austempering, and modifications of these processes are hot quenches.

In martempering, steel is cooled rapidly to a temperature in the vicinity of Ms, usually slightly above Ms; the work is held long enough to equalize temperature throughout the section but not long enough for bainite formation; and finally the part is very slowly cooled, usually in air, through the martensite formation range. Mf temperatures are not well established but are believed to be about 150-300° F below Ms.

In austempering, steel is cooled rapidly to and held at a constant subcritical temperature long enough for a completely bainitic structure to form, usually followed by water cooling. Temperatures in the order of 500-800° F are involved. Depending on the required product characteristics and steels used, several modifications of martempering and austempering processes are being successfully used in industry. The hot oil quenching process is one modification which will be described later. All of these modified processes depend on and may readily be understood from the principles presented above.

Quenching Media—Aside from the fact that it must give the required hardness without excessive distortion, the requirements of a satisfactory quenching medium are shown qualitatively in the accompanying tabulation. A comparison of these factors for quenching media in common use is presented. Cooling in still air is usually employed only for high alloy steels in complicated or massive sections. The poor heat transfer properties of gases obviate their use for rapid cooling, which is necessary in hot quenching, as it is generally uneconomical to provide large volumes of cool gas to metal surfaces.

The more favorable thermal properties of liquids permit satisfactory cooling rates with a variety of these media. It is important to remove gases, primarily from vaporization of the medium but also entering on the work and in the liquid, from the surface of the work, since gases hinder cooling markedly. Mechanical agitation and circulation of the liquid against the work are the best means of accomplishing this, and at the same time the resulting uniform bath temperature gives uniform hardness and reduces the localized overheating of the medium with gas evolution.

Drastic Cooling Rates—Water or aqueous solutions furnish the drastic cooling rates, approaching the theoretical maximum, required for hardening plain carbon or low alloy steels of low or medium carbon content and of small grain size used for pieces of low mass and simple shape. Water provides the additional advantages of cleanliness, ease of handling, and presents no fire hazard. It should be mentioned that low-carbon steels of fine grain size possess such low hardenability that they cannot be properly hardened by quenching.

While oil will not harden water-hardening grades of steel, it is widely used where a water quench is too drastic and provides uniform quenching for a wide

Summary of Advantages and Disadvantages of Hot Oil Quenching

Hot oil quenching, compared to conventional quenching, requires more equipment, greater safety precautions, cleaning of the work during the latter stages of oil life and is limited with respect to the size, shape, and types of steel that can be quenched to full hardness. Unless distortion or residual stresses are problems, it may not be desirable to use a hot oil quench.

The process is, however, applicable to a wide range of important steels. For the many cases in which satisfactory hardness can be obtained, it gives improved control of dimensional changes by reducing or eliminating distortion, and increased service life and load-carrying capacity of the parts results from reduced residual stresses.

Production-wise, hot oil quenching greatly increases the output per furnace due to: Elimination or reduction of finishing operations; large reductions in rejects; and expediting subsequent assembly. Reduced tolerances before hot quenching may also be possible.

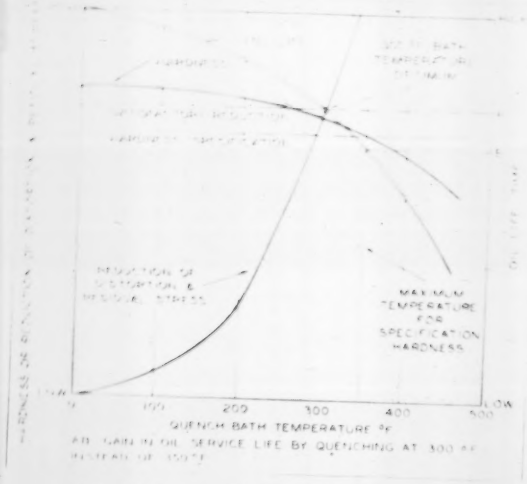


Fig 3 Optimum hot oil quenching temperature

formed method the part contacts a cooled solid surface, while in the second method the object is held to eliminate distortion while it is quenched with a liquid medium.

Hot Oil Quenching. Hot oil quenching involves quenching steel into mineral oil at 300-400°F and holding for temperature equalization, followed by very slow cooling in air to room temperature. Depending on the Ms temperature of the steel, three basically different types of quenching are involved, as shown in Fig. 3. When the bath temperature is near or slightly above Ms (Q), true martempering is obtained, provided the holding time does not permit transformation to lower bainite. When the bath temperature falls within the martensite formation range (Q), a modified martempering operation results since martensite formation has not been completed.

Depending on the bath temperature, a good proportion of the advantages of martempering can result since much of the steel is still in the plastic austenitic condition, allowing stress relief and reducing distortion, cracking and retained austenite. Additional advantages are gained:

1. Reduction in thermal gradient in the piece above the martensite range (as in martempering) due to slower cooling and
2. bainite will not form during holding for temperature equalization, as is possible in martempering. This is an advantage where thick sections are involved and where the hardness requirements will tolerate no bainite.

Like Martempering. If the bath temperature is below the martensite range (Q), the reduction in thermal gradient in the piece above and through the martensite range and the freedom from possible bainite formation are still worthwhile advantages promoting uniform hardness in the quenched work and obtaining some of the advantages of martempering.

Thus it is readily seen that constant temperature hot oil quenching may be equivalent to martempering. If martempering does not result, differing degrees of the advantages of martempering may nevertheless be obtained along with the additional advantage of freedom from possible bainite formation. All of these quenches are definitely advantageous when used for suitable steels. Specific results with a given steel depend especially on factors affecting Ms and also on the steel used, the part quenched, austenitizing conditions and the quenching operation, its conditions and their control, the oil medium, and the equipment employed. The importance of final tempering is clear.

Systems Readily Converted. Hot oil quenching may be conducted on a large or small scale in a variety of types of equipment, including continuous, batch and fixture units. It is possible that many existing quenching systems can be readily converted to hot oil quenching. Fig. 2 illustrates some of the many possible variations in a well-appointed, continuous, hot quenching system. The particular equipment required will depend on the exact service and installation size.

Time, Temperature, Agitation. For a given steel

SUMMARIZED COMPARISON OF QUENCHING MEDIA

Properties	Ideal Requirements	Water and Water solutions	Mineral Oil[1]	Air
1. Cooling rate	Must cool at the desired rate	Fastest	Intermediate	Slowest
a. At knee of S-curve	Minimum rate must equal critical cooling velocity	Very fast	Fast enough for many steels	Too slow for any but special high alloy steels
b. Below knee of S-curve	Cool very slowly	Very fast	Cools much more slowly than water	Cools very slowly
2. Effect of temperature on cooling rate	No significant decrease as temperature rises—increase is desirable	Water cooling rate decreases rapidly as temperature rises; salts are better	Cooling rate improves as temperature rises	Very little effect; still very slow
3. Safety	Safe	Water is safe but some salts explode and caustic is dangerous	Some fire hazard but low with proper oil and precautions	Safe
4. Service life	Long	Caustic solution must be replaced often	Satisfactory with proper precautions	No problem
5. Initial cost	Low	Generally consistent with the results obtained — salt solutions and air currents require special equipment		
6. Cleaning quenched work	Easy	Salts require a water wash	Satisfactory methods are available	No problem
7. Ease of handling	Easy	Difficulty with salts	Easy	No problem in still air
8. Corrosion	None	Salts are corrosive	None	None
9. Drag-out and evaporation loss	Low	Usually low	Low with proper oil	No problem
10. Availability	Good	Good	Good	Good
11. Effect on properties of quenched metal	None	None	None	None

[1] Animal, fish, and vegetable oils are much less widely used than in the past due to inferior odor and oxidation quality.

part, austenitized under definite conditions, the most important hot quenching variables directly affecting product quality are time, temperature, and agitation.

If quenching time is too short, full equalization of temperature in the work will not be obtained. If a piece is quenched too long, production is slowed and, in martempering, bainite may be formed. Optimum quenching time is necessary to meet uniformly product physicals and minimize distortion, cracks, residual stresses and retained austenite. Hot quenching times of 8 minutes maximum are involved in present commercial practice.

The optimum quenching temperature, which must not be so high that satisfactory hardness is not obtained, is a compromise between oil life and reduction of distortion and cracking. These relations are presented for a hypothetical case in Fig. 3. While satisfactory hardness is not obtained at bath temperatures over 350°F, a satisfactory reduction of distortion and residual stress is obtained at 300°F, permitting a substantial gain in oil service life by quenching at 300°F (increment AB). Present commercial practice indicates maximum temperatures required to be about 400°F. The importance of temperature control for uniform product hardness is acknowledged by commercial practice, being considered good if the bath is automatically controlled to within ±5°F. Good mechanical agitation and adequate circulation rates and cooling facilities are very effective for controlling temperature.

Start at 200° F—It is natural for the metallurgist, who considers martempering as the primary means of reducing distortion, to experiment with temperatures too high for hot quenching with the result that satisfactory hardness is not obtained. A preferred approach would be to start at about 200°F and progressively try higher temperatures to determine the maximum temperature giving the required hardness and then evaluating the reduction in distortion and residual stresses obtained. Good agitation is a vital necessity to the success of such experiments.

Good agitation is a prime requirement for uniform product quality, especially hardness. The bath should be agitated constantly during quenching to assure high oil velocities past the work surface as has already been emphasized. Agitation may be provided by mechanical means or by circulation, preferably by both methods, and is importantly related to the tank geometry.

Finishing—Six hours of air cooling is generally sufficent to complete the martensite transformation in the quenched part. In comparison to the advantages resulting from hot oil quenching, the necessity for cleaning from the pieces the deposits of oxidized material from the used oil has been considered a minor inconvenience. Cleaning methods used include spraying the work with an oil solvent followed by an alkaline spray, trisodium, phosphate type sprays, and hot water rinsing to float off the oil. Where it is safe and adequate ventilation is available, kerosene or safety naphtha washing affords one of the best cleaning methods. In all cases, any carbon remaining on the work is removed by conventional tempering for recovery of toughness and ductility, already described, at 300-350°F for 1-2 hours per inch of thickness.

Battery Power Restored

Gould-National Batteries Inc. offers two-page, 8½ x 11-inch data sheets on how to return to full service motive power storage batteries which have lost capacity due to sulphation. This condition is the formation of lead sulphate on the positive and negative plates due to continued undercharging while in use, or prolonged idleness without charge.

Sheets give six causes of sulphation and detail 11 steps to follow to restore batteries having various degrees of sulphation—from early development stages to the point where the battery must be scrapped. For copies, write to Gould-National Batteries Inc., Trenton 7, N. J.

range of alloy steels. In the early stages of cooling, the vapor-blanket and bubble periods, the cooling rate in oil increases while it slows markedly in the final stages—this indicates that for the steels for which it is used, oil comes the closest to meeting the cooling rate requirements necessary for an ideal quenching medium.

Cooling rate obtained with oil may be increased not only by agitation but also by careful compounding with selected high quality fatty materials. These steels, called deep or oil-hardening steels, contain appreciable alloy content which increases hardenability and makes them suitable for thicker, more complicated parts in which the reduction of residual stresses and distortion is important. A properly selected oil for conventional quenching at about 100°F will have the advantages shown in the table.

More Stresses—Temperature gradient from surface to center of a part increases with cooling rate. This explains why parts quenched in water are subject to more residual stresses, cracking, and distortion. In addition to the transformation stress resulting from the increase in volume when martensite forms from austenite at the surface, the thermal gradient delays the center transformation and new stresses are then set up when the center transforms. Under these conditions the center is trapped in the hard martensite case already formed at the surface. In oil quenching the thermal gradient is greatly reduced, and the surface and center of the part transform at more nearly the same time, reducing cracking, distortion, and residual stresses.

On the practical side, quench bath temperature variation is much less critical with oil than with water. This simplifies control and assures a product of uniform quality.

Special quenching methods for very close tolerances include cold die quenching presses. In the former method the part contacts a cooled solid surface, while in the second method the piece is held to eliminate distortion while it is quenched with a liquid medium.

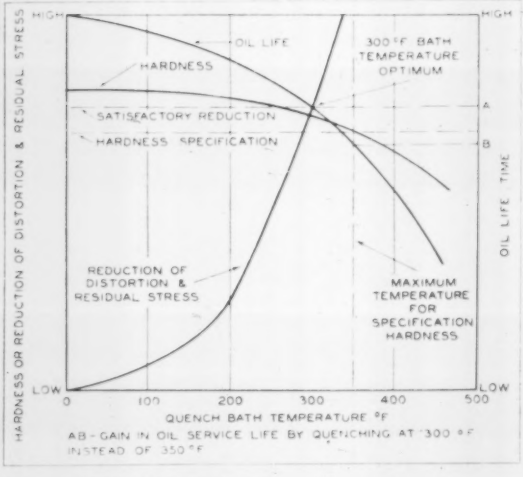


Fig. 3—Optimum hot oil quenching temperature

Hot Oil Quenching—Hot oil quenching involves quenching steel into mineral oil at 200-400°F and holding for temperature equalization, followed by very slow cooling in air to room temperature. Depending on the Ms temperature of the steel, three basically different types of quenching are involved, as shown in Fig. 1. When the bath temperature is near or slightly above Ms (Q_1) true martempering is obtained, provided the holding time does not permit transformation to lower bainite. When the bath temperature falls within the martensite formation range (Q_2), a modified martempering operation results, since martensite formation has not been completed.

Depending on the bath temperature, a good proportion of the advantages of martempering can result, since much of the steel is still in the plastic austenitic condition, allowing stress relief and reducing distortion, cracking, and retained austenite. Additional advantages are gained:

1. Reduction in thermal gradient in the piece above the martensite range (as in martempering) due to slower cooling, and
2. bainite will not form during holding for temperature equalization, as is possible in martempering. This is an advantage where thicker sections are involved and where the hardness required will tolerate no bainite.

Like Martempering—If the bath temperature is below the martensite range (Q_3), the reduction in the thermal gradient in the piece above and through the martensite range and the freedom from possible bainite formation are still worthwhile advantages, promoting uniform hardness in the quenched work and obtaining some of the advantages of martempering.

Thus it is readily seen that constant temperature hot oil quenching may be equivalent to martempering. If martempering does not result, differing degrees of the advantages of martempering may nevertheless be obtained, along with the additional advantage of freedom from possible bainite formation. All of these quenches are definitely advantageous when used for suitable steels. Specific results with a given steel depend especially on factors affecting Ms and also on the steel used, the part quenched, austenitizing conditions, and the quenching operation—its conditions and their control, the oil medium, and the equipment employed. The importance of final tempering is clear.

Systems Readily Converted—Hot oil quenching may be conducted on a large or small scale in a variety of types of equipment, including continuous, batch and fixture units. It is possible that many existing quenching systems can be readily converted to hot oil quenching. Fig. 2 illustrates some of the many possible variations in a well-appointed, continuous, hot quenching system. The particular equipment required will depend on the exact service and installation size.

Time, Temperature, Agitation—For a given steel

SUMMARIZED COMPARISON OF QUENCHING MEDIA

Properties	Ideal Requirements	Water and Water solutions	Mineral Oil[1]	Air
1. Cooling rate	Must cool at the desired rate	Fastest	Intermediate	Slowest
a. At knee of S-curve	Minimum rate must equal critical cooling velocity	Very fast	Fast enough for many steels	Too slow for any but special high alloy steels
b. Below knee of S-curve	Cool very slowly	Very fast	Cools much more slowly than water	Cools very slowly
2. Effect of temperature on cooling rate	No significant decrease as temperature rises—increase is desirable	Water cooling rate decreases rapidly as temperature rises; salts are better	Cooling rate improves as temperature rises	Very little effect; still very slow
3. Safety	Safe	Water is safe but some salts explode and caustic is dangerous	Some fire hazard but low with proper oil and precautions	Safe
4. Service life	Long	Caustic solution must be replaced often	Satisfactory with proper precautions	No problem
5. Initial cost	Low	Generally consistent with the results obtained — salt solutions and air currents require special equipment		
6. Cleaning quenched work	Easy	Salts require a water wash	Satisfactory methods are available	No problem
7. Ease of handling	Easy	Difficulty with salts	Easy	No problem in still air
8. Corrosion	None	Salts are corrosive	None	None
9. Drag-out and evaporation loss	Low	Usually low	Low with proper oil	No problem
10. Availability	Good	Good	Good	Good
11. Effect on properties of quenched metal	None	None	None	None

[1] Animal, fish, and vegetable oils are much less widely used than in the past due to inferior odor and oxidation quality.

part, austenitized under definite conditions, the most important hot quenching variables directly affecting product quality are time, temperature, and agitation.

If quenching time is too short, full equalization of temperature in the work will not be obtained. If a piece is quenched too long, production is slowed and, in martempering, bainite may be formed. Optimum quenching time is necessary to meet uniformly product physicals and minimize distortion, cracks, residual stresses and retained austenite. Hot quenching times of 8 minutes maximum are involved in present commercial practice.

The optimum quenching temperature, which must not be so high that satisfactory hardness is not obtained, is a compromise between oil life and reduction of distortion and cracking. These relations are presented for a hypothetical case in Fig. 3. While satisfactory hardness is not obtained at bath temperatures over 350°F, a satisfactory reduction of distortion and residual stress is obtained at 300°F, permitting a substantial gain in oil service life by quenching at 300°F (increment AB). Present commercial practice indicates maximum temperatures required to be about 400°F. The importance of temperature control for uniform product hardness is acknowledged by commercial practice, being considered good if the bath is automatically controlled to within ±5°F. Good mechanical agitation and adequate circulation rates and cooling facilities are very effective for controlling temperature.

Start at 200° F—It is natural for the metallurgist, who considers martempering as the primary means of reducing distortion, to experiment with temperatures too high for hot quenching with the result that satisfactory hardness is not obtained. A preferred approach would be to start at about 200°F and progressively try higher temperatures to determine the maximum temperature giving the required hardness and then evaluating the reduction in distortion and residual stresses obtained. Good agitation is a vital necessity to the success of such experiments.

Good agitation is a prime requirement for uniform product quality, especially hardness. The bath should be agitated constantly during quenching to assure high oil velocities past the work surface as has already been emphasized. Agitation may be provided by mechanical means or by circulation, preferably by both methods, and is importantly related to the tank geometry.

Finishing—Six hours of air cooling is generally sufficient to complete the martensite transformation in the quenched part. In comparison to the advantages resulting from hot oil quenching, the necessity for cleaning from the pieces the deposits of oxidized material from the used oil has been considered a minor inconvenience. Cleaning methods used include spraying the work with an oil solvent followed by an alkaline spray, trisodium, phosphate type sprays, and hot water rinsing to float off the oil. Where it is safe and adequate ventilation is available, kerosene or safety naphtha washing affords one of the best cleaning methods. In all cases, any carbon remaining on the work is removed by conventional tempering for recovery of toughness and ductility, already described, at 300-350°F for 1-2 hours per inch of thickness.

Battery Power Restored

Gould-National Batteries Inc. offers two-page, 8½ x 11-inch data sheets on how to return to full service motive power storage batteries which have lost capacity due to sulphation. This condition is the formation of lead sulphate on the positive and negative plates due to continued undercharging while in use, or prolonged idleness without charge.

Sheets give six causes of sulphation and detail 11 steps to follow to restore batteries having various degrees of sulphation—from early development stages to the point where the battery must be scrapped. For copies, write to Gould-National Batteries Inc., Trenton 7, N. J.

Experience Growing in Forming,

Quick surface oxidation plus tendency to gall and seize require care in hot forming and annealing, along with proper selection of lubricants in drawing, machining and grinding

By JAMES McELGIN
E. F. Houghton & Co., Philadelphia

FORMING and machining of titanium alloys constitute almost unexplored fields and give rise to much speculation over the best methods to use. Because entire production of the metal in 1950 was only 60 tons, there has not been much opportunity for collecting data and experience.

The writer's company has made a study of heat treatment, cold forming and machining characteristics because of this early interest in titanium alloys and their potential uses. From data already published there are certain facts fairly well established about working of titanium alloys (STEEL, Jan. 8, p. 54).

For example, the titanium alloys have a high oxidation resistance at temperatures up to 1400°F. The medium temperature creep strength is excellent. There is practically no creep at 600°F under a stress of 25,000 psi and a creep rate of 0.00012 per cent per hour at 1000°F under a stress of 2000 psi.

Rate Below Stainless Steels—Titanium alloys can be forged, hot rolled or welded readily. However, machinability characteristics are low, being between the austenitic stainless steels and the jet engine superalloys in this respect.

Cold forming properties of some of the titanium alloys also are poor, necessitating forming in a heated condition similar to the practices used for forming magnesium and 75S-2 aluminum alloy.

Forging practice has been outlined, with emphasis on the narrow temperature range. The alloys are heated to 1800°F, but forging must stop when temperature falls to 1600°F. This means a minimum loss of time between heating and forging, or else reheating in order to complete the forging operation. Above 1850°F there is a rapid absorption of nitrogen and oxygen at the surface of the metal will produce a hardened case structure. If the forging is continued at temperatures below 1600°F, there is a serious danger of cracking.

Some scale is produced on the titanium alloys during the heating for forging. It tends to adhere to the forging dies and must be removed by scraping or wire brushing between forging operations.

Oxide Layer Must Be Avoided — Recommended practice for annealing is to heat at 1300-1400°F for 1 hour for forgings, 15 minutes for sheets, using air furnaces. Inert atmospheres such as argon or helium have been used to prevent the formation of the hard oxidized surface layer which is produced when heating in air.

There would appear to be no difficulty in salt bath annealing at 1350°F. Salt prevents surface attack. The time required to anneal in salt is less than in air—45 minutes for forgings, 10 minutes for sheets. A limited amount of experimental work has already been annealed in molten salt, with no hard oxidized surface layer resulting.

Titanium and its alloys can be stress relieved by heating at 550°F in air furnaces. A treatment of one hour is recommended for forgings and 15 minutes for sheet stock. The stress relief anneal of cold worked titanium will increase the minimum bend radius and prevent cracking.

Surface hardening is important for titanium and titanium alloys since they tend to gall, seize or cold weld when used in applications where there is any rubbing or wearing action. It is difficult to prevent some oxygen pickup when hot working the alloys. As a consequence, some surface hardening occurs. The alloys can be surfaced hardened to a depth of 0.025-inch by heating in air at 1700-1900°F for one hour.

E. P. Lubricants for Drawing—It has already been observed that titanium alloy sheets have forming characteristics somewhat poorer than ¾-hard stainless steel (302 or 304). Slow rate of strain has been found advantageous because it permits a greater plastic deformation without rupture. For shallow draws or simple brake bending or forming at room temperature, a highly concentrated extreme pressure type of drawing lubricant with polar additives is recommended.

For deep or intricate drawing operations where there is any appreciable stretching of the metal, it is advisable to use hot forming practices such as are used for magnesium or 75S-T aluminum. It is recommended that, on these applications, the dies and workpiece be heated to 550-600° F and that drawing lubricants be used.

It is apparent that a phosphate film on the surface of titanium alloy blanks will reduce the danger of welding to the die. The blank may be immersed for a few minutes in a standard phosphating bath before heating. If more than one draw is required, a stress relief anneal at 550°F for 15 minutes is recommended between draws. If hot forming practices are employed, this stress relieving will occur during the heating of the partially drawn shape prior to the second drawing operation.

Investigation at E. F. Houghton has confirmed the

Machining Titanium Alloys

relatively low machinability rating of titanium alloys. Based on a rating of 100 for B-1112 steel, 18-8 stainless has a machinability rating of 25, while titanium and titanium alloys are in the 15 to 20 range.

Chips Weld to Tools—Titanium has a tendency to wet a mating metallic surface under conditions of high pressure. This is the cause of the greatest difficulty experienced in machining—welding of the chips to the cutting tool. Drilling and tapping are difficult because of this chip welding which results in a galling of the tool. When external threading, it is advisable to mill or chase in a lathe. Should dies be used to cut the threads, the tendency of this metal to weld to the die will be apparent.

When high-speed steel tooling is used, it is recommended that the finish grind of the tool be done with a fine grit wheel followed by polishing. This will reduce the tendency for chip welding. Hard chrome plating of high-speed steel tools, especially drills, taps and reamers, will tend to prevent chip welding and subsequent galling.

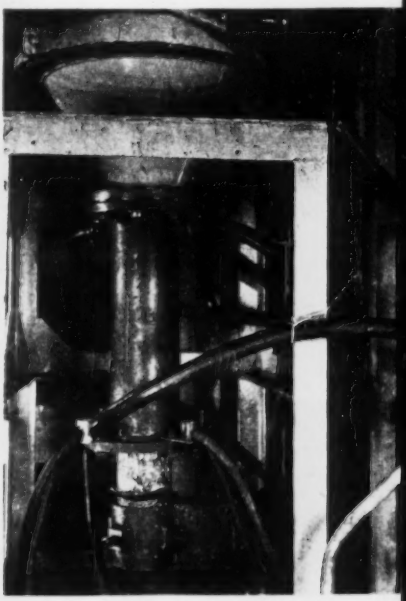
A number of grades of carbides are being successfully used in the machining of titanium.

Tool Shapes Conventional—In general, tool designs with reference to nose radius, back rake angle, side rake angle, side cutting edge angle, end cutting edge angle, resultant rake angle, inclination side relief and end relief which have been successfully used in the machining of austenitic 18-8 stainless steel are satisfactory in the machining of titanium.

From data accumulated, it is evident that the most satisfactory results in machining have been with slow heavy cuts. For rough cuts, a speed in the range of 30 to 40 surface feet per minute with a minimum feed of 0.030-inch per revolution and a depth of cut about double the feed have been found to be the most generally satisfactory. On finishing cuts, a speed of 50 to 60 surface feet per minute with a minimum feed of 0.015-inch per revolution and a depth of cut about equal to the feed have also been found to be satisfactory.

In machining titanium, the tool should be worked as heavily as possible consistent with the design of the part, the power available in the machine tool and finish required. The tool should never be permitted to ride on the work or at the bottom of a drilled or tapped hole as work hardening or welding will occur.

Sulphurized Oils Advisable—One of the most important factors in the machining of titanium is the use of a cutting fluid with the highest possible lubricity and antiwelding characteristics. Combinations of sulphur with fatty and mineral oils have been used with some success. Oils containing sulphur have an increased film strength. Their chief value in machining titanium is due to the properties of sulphur in acting as an antiflux- (*Please turn to Page* 94)



Two views of recently developed arc furnace for continuous casting of titanium ingot melted down from sponge. At left is the upper level of the furnace; at right the lower level. Courtesy Du Pont Magazine, August-September, 1951

Careful Analysis Can Lower Your CUTOFF COSTS

This comparison of sawband and abrasive wheel cutting techniques reveals that both have definite advantages and limitations which must be considered when selecting the most economical and practical method for your plant

CUTTING-OFF operations are as much as part of manufacturing as any other metalworking procedure, with material economy, tool expenditure and actual cutting time remaining inseparable factors. It is true that every type of modern equipment industrially used to cutoff or separate materials is individually efficient; however, while each method has its advantages it also has limitations and for maximum economy in the long run one must therefore take over when another is no longer profitable. This is particularly true with both ferrous and nonferrous materials.

Where production is exceptionally high and quite uninterrupted, it can be rightly assumed that every type of cutoff equipment is an excellent investment; yet, the fact that a machine is temporarily idled and another is overworked does not necessarily indicate inefficiency since operating costs are often thus slashed to a marked degree.

Because sawbands now have exceptionally long life even under most severe cutting conditions, and plus the fact that most modern vertical-type band machines are engineered for hydraulic control of all movements and infinitely variable speeds of from 40 to 10,000 fpm, this combination is deserving of the utmost consideration. Band and abrasive wheel cutoff processes have much in common since they are both continuous whether or not the abrasive cutoff machine is of conventional or oscillating design. With full realization that there is a choice of two distinct bandsaw techniques in favor of vertical type equipment, only by being familiar with both can management apply the proper one at the proper time or else decide against both in favor of the abrasive cutoff method.

Lighter Metals Cut Faster at High Speeds—Conventional or low speed sawing is not affected by height of cut or type of material, meaning that all ferrous metals and such nonferrous metals as brass, bronze, copper and zinc come within the machine's full cutting height capacity. Also not limited by material height are the light metals which however cut considerably faster at high speeds of from 2000 to 4000 fpm depending on thickness. On the other hand, friction sawing technique, although limited to ferrous sections not exceeding 1-inch, economically speaking, most favorably competes with the abrasive cutoff wheel and this is especially true with steel tubing having an outside and inside diameter that results in a thickness within that mentioned above as the band penetrates the inner wall.

Material waste attributed to difference of kerf width, degree of accuracy and finish, comparative tool and operating costs are all factors effecting the decision as to the most economical cutoff procedure for each case. It can be said that for cutting round, square or other irregular ferrous or nonferrous sections ranging from 1 to 2 inches that the abrasive wheel has no lower cost alternative. While the oscillating method shows a marked increase in number of cuts per wheel over nonoscillating machines, it also shows a proportionate increase in cutting time. A high grade precision sawband under proper control will stand up efficiently 8 hours on 2-inch molybdenum steel and cut 450 square inches; wheel life would be but 15 minutes by nonoscillating movement. The same wheel will last 1 hour when cutting a 6-inch diameter bar by the oscillating method but will produce only 10 cuts.

Unnatural Wear Determines Wheel Costs—Several factors govern wheel wear; however, what really determines wheel costs as a whole is unnatural wear, and to this must be added wheel breakage, which unfortunately often occurs too early after a new wheel has been mounted. Research along lines of abrasive cutoff practice definitely shows that considerably longer wheel life results when cutting with a coolant, as much as conditions will permit. When wet-abrasive cutting, full advantages can be derived from rubber-bonded wheels properly selected, because the coolant not only maintains the hardness of these wheels, and meanwhile sharp cutting grains, but also reduces amount of change in physical characteristics of the material being cut. With wet abrasive cutoff, wheel surface speed is considerably less than that required for dry cutting. With the latter technique excessive wheel speeds are required to soften material in the kerf, because otherwise the material

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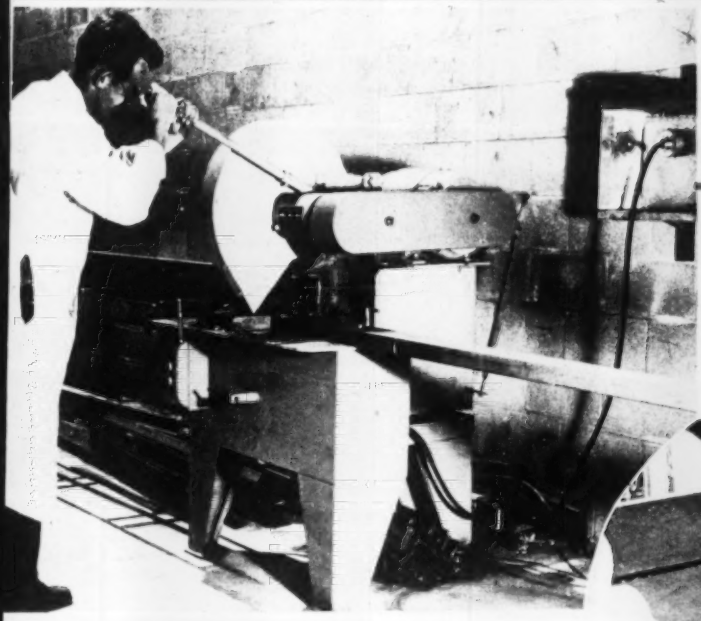
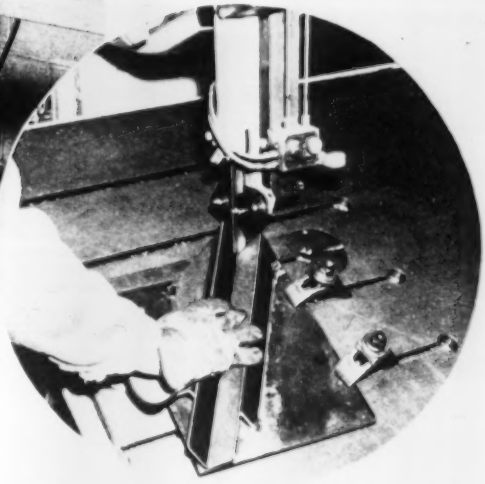
Research Engineer
DoAll Co.
Des Plaines, Ill.





Above—Cutting off a 4-inch steel angle by the abrasive wheel method

Right—Friction sawing an angle of approximately the same cutting area as the one shown in the other photo

would tear off the wheel grains before they do their work. There is also the problem of heat which cannot be readily dissipated.

A most frequent setback with dry abrasive cutoff procedure is the operator's inclination to reduce feeding pressure through fear of the high wheel-speed, although he is amply protected. Therefore, lack of sufficient work pressure causes the wheel to glaze rapidly, inviting heat and subsequent breakage. On the other hand, excessive work pressure is just as bad and is also a cause of unnatural wheel wear. In short, experience proves that dry cutoff operations should be limited to tool work, short-run production or the lighter cuts, preferably under $1\frac{1}{2}$-inch round or square. Excessive wheel cost results mostly from dry cutting thicker sections, and wheel breakage is likewise unreasonably high, especially when cutting work that cannot be held rigidly by mechanical means, or must be guided into the wheel manually. It is also true that the dry cutoff wheel operating at 14,000 or 16,000 surface feet per minute, has a greater tendency to flex than the wet cutting wheel operating at 6000 or 7000 surface feet per minute, hence the reason why the variation in length of cuts can be held much closer by wet cutting.

Abrasive Wheel Gives Better Finish of Cut—Friction and abrasive cutoff costs on solid ferrous sections up to 1-inch are reasonably well balanced, however, the abrasive wheel leaves a better finish of cut. On the other hand, thicker the cut—higher the wheel cost and in some instances the abrasive cutoff machine pays higher dividends when idle. This is indeed true with foundry practice where friction sawing often effects sufficient savings in the removal of gates and risers on thinner cuts to offset the cost of abrasive wheels for thicker sections.

Functions of the friction band and the dry abrasive cutoff wheel are practically the same. Both operate at very high speeds and generate heat to soften the material directly in front of the cutting edges to a plastic state. However, excessive heat from undue pressure is most injurious to the abrasive wheel whereas the friction saw suffers for its material thickness limitations because sufficient heat cannot be generated fast enough. Friction sawing speed range starts at 3000 fpm on thinner sections and gradually increases to a recommended maximum field application speed of 10,000 fpm. The addition of various alloys to the iron changing the softening character-

COMPARISON OF ABRASIVE CUTTING AND FRICTION SAWING

Abrasive Cutting (pull-down type machine)

In Inches Material Diameter (carbon steel)	Time per cut (seconds)	Cuts per 16 x $\frac{5}{32}$-inch Wheel
$\frac{1}{2}$	2	1150
$\frac{3}{4}$	3.5	500
1	5	400
$1\frac{1}{4}$	8	200
$1\frac{1}{2}$	12	100
2	18	50

Abrasive Cutting (oscillating method) (inches)

1	10	600	18 x $\frac{5}{32}$-inch wheel
$1\frac{1}{2}$	25	300	
2	50	160	
3	150	50	
4	210	35	20 x $\frac{1}{8}$-inch wheel
6	600	10	

Friction Sawing (stainless steel)

Material Thickness (inches)	Saw Velocity (fpm)	Lineal Inches Cut per Minute
$\frac{1}{8}$	6000	45
$\frac{3}{8}$	7000	36
$\frac{1}{2}$	8000	28
$\frac{5}{8}$	9000	48
$\frac{3}{4}$	10,000	15
1	12,000	4 to 6*

*Depending on operator dexterity

Friction Sawing (stainless tubing)

Dimensions (inches)	Saw Velocity (fpm)	Cuts Per Minute
1 X $\frac{1}{8}$	10,000	80
$1\frac{1}{2}$ x $1\frac{1}{8}$	10,000	16
2 x $1\frac{1}{2}$	8000	30
3 x $2\frac{1}{2}$	8500	20
4 x $3\frac{1}{2}$	9000	9
12 x $11\frac{1}{2}$	8000	30

Other tubing will cut faster, all depending on analysis

istics of the steel, plus increased material thickness, demand a gradual step-up in blade velocity to generate the additional heat.

Friction Sawing for Most Steel Tubing—A very high percentage of steel tubing now industrially used is within the scope of the friction sawing process, with a production increase of as much as 1000 per cent over conventional or low speed sawing. Because when cutting tubing the maximum work thickness is approached only momentarily, friction cutting is limited to a certain wall thickness per given diameter. In other words, 1-inch diameter tubing regardless of the inside diameter is considered a solid round but obviously if its wall thickness is only 1/16-inch the tubing will friction-cut faster than if the inside diameter were $\frac{1}{4}$-inch. Starting with $1\frac{1}{4}$-inch OD tubing, the wall thickness decreases as the outside diameter increases in step with the 1-inch maximum friction sawing limitation. The substantially high cutting rates possible, if and when the process is applicable, are worthy of consideration by production keymen when in doubt as to whether the friction band or abrasive wheel is the most economical procedure in the long run.

Cutting of steel tubing having dimensions not within range of the friction process is expedited in low speed machines with fixtures providing multiple cuts. This also applies to bronze tubing which must necessarily be cut at low speeds because of its abrasive characteristics. On the other hand, cutting of brass, copper and aluminum tubing is tremendously expedited by the high speed (not friction) technique due to the fact that velocities can be varied in steps of 500 fpm rather than 50 or 100 fpm as with conventional sawing.

Big Metal Bite Taken in One Step

Removing more than $\frac{3}{4}$-pound of metal to produce a rectangular hole is handled in a single setup with a simple fixture at the job broaching plant of Weaver Broaching Co., Detroit, by using three passes. The part having a $\frac{7}{8}$-inch diameter reamed hole is positioned between four pins set in a thrust plate. A locating, automatic broach puller and the hole in the part serve to locate the broach.

Tendency to drift is reduced by designing the broaches so they are continuously guided in the part. For instance, in the first and second passes, stock is removed from opposing sides only forming a rectangular slot having a width equal to the original hole diameter. The third pass finishes the length of the slot, guiding in the width, and then the width while guiding between the ends of the slot. Operation is performed on a 10-ton, 60-inch stroke Colonial broaching machine and broaches are supplied by the same company. Despite the heavy cuts taken in the alloy forging, tools have a long life.

Main Drive Motors Head for Italy

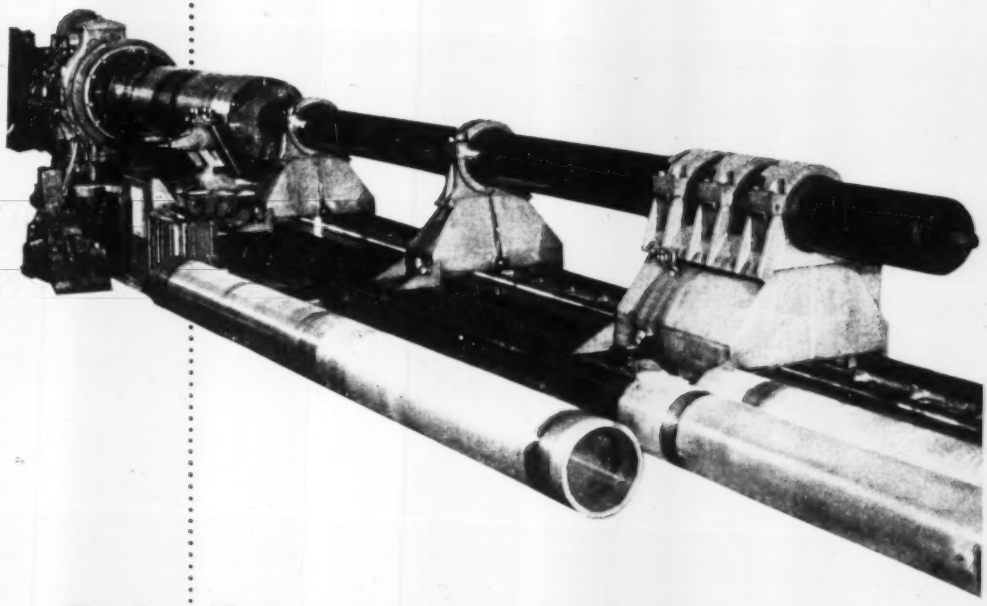
Fiat Co. of Turin, Italy, largest automobile manufacturer in that country, has ordered six main drive motors and complete electronic controls from the Westinghouse Electric International Co., New York, for a new 24-stand rod and merchant steel mill. The mill will be used for precision rolling of steel products for automobiles and airplanes. Installation of the new mill represents a final stage in Fiat's steel expansion program for which Westinghouse is supplying large motors, controls and related electrical equipment.

Motor control system will include electronic speed regulators and field boosters to keep variations in motor speed within extremely close limits. Control will be decentralized, with a master control desk and four control sets for the roughing, intermediate and finishing sectors. Besides six main drive motors for the finishing sector being built in the U. S., the Marelli Co. of Milan, Westinghouse Italian licensee, is supplying 12 motors for the intermediate sector, in capacities ranging from 750 to 1000 hp.

Electronic System Handles Tests

Dynamometer loads are weighed by an electronic system recently adopted at the Woodridge, N. J., plant of Wright Aeronautical Corp. SR-4 load cells supplied by Baldwin-Lima-Hamilton Corp., Philadelphia, are connected under the column linked to the arm of a General Electric cradle type dynamometer of 3000 hp capacity.

The dynamometer is being used for full scale tests of aircraft reciprocating engines. A similar load cell is being used in the same way with an eddy-current brake dynamometer for these tests. These cells have also been adopted at Woodridge for measuring the thrust force of aircraft turbo jet engines. Force measuring equipment is a part of an expanding program of production and experimental testing of turbo jet aircraft engines.



Rebuilt for new-machine accuracy

Re-engineered for greater capacity

It took some expert machine-tool engineering to convert a 72″ boring lathe into this high-capacity, rapid-production machine. Here's how Simmons *Engineered Rebuilding* went to work for Sandusky Machine & Foundry Company, Sandusky, Ohio:

- **Original 72″ swing increased to 84″ clear over bed.**
- **Capacity increased to take 30″ boring bar.**
- **New carriage has independent motor-operated feed and rapid traverse.**
- **Headstock raised; new castings made for tailstock and bar-rests.**

In addition to adding new capacity, Simmons completely rebuilt the original lathe... dismantled it down to bare castings and thoroughly cleaned it... replaced worn parts... refinished sliding surfaces.

Have you an unusual rebuilding job? Simmons' extensive engineering and manufacturing facilities are especially adapted to the rebuilding of every type of machine tool up to the largest sizes.

Give machine-tool rebuilding a priority in your plans for defense and consumer production. You can start by sending us a list of your machines that require rebuilding. We'll promptly quote prices and deliveries and send you case examples of machine tools rebuilt "The Simmons Way."

SIMMONS MACHINE TOOL CORPORATION
1755 North Broadway, Albany 1, N. Y.

SIMMONS ENGINEERED REBUILDING
Gives Machine Tools a New Lease on Life

Metal Stitching Speeds Aluminum Door Assembly

METAL stitching has increased production of aluminum door assemblies more than 30 per cent at Tomfohr Overhead Door Co., Portland, Ore. In addition, fastener costs have been lowered approximately 75 per cent and labor charges reduced more than 65 per cent.

Formerly, two men were required. Working together, they assembled one door every 55 minutes, or nine doors per 8-hour shift. With metal stitching, one man is now able to complete a door every 45-minutes, or 12 doors per 8-hour shift.

In this application, stitches having 7/16-inch crowns (internal distance between legs), join the sheet aluminum faces of these doors to aluminum structural supporting members. Stitches are formed from 18-gage stainless steel wire in the following manner: Wire is fed from the 10-pound coil, cut to length, formed into a stitch, driven through the required material thickness, and clinched in 1/5-second. Because stitches are fully supported as they are driven they can penetrate thicknesses three to four times their diameters.

A special setup, consisting of a power-operated table, movable in four directions, and an Acme-Morrison metal stitcher with an extended throat was designed and installed by Tomfohr engineers to adapt the production of this 8 x 8-foot all-aluminum door to metal stitching.

The stitcher was rebuilt by cutting the casting between the stitching head and flywheel and extending the throat to 4 feet so the head would reach the center of the work. Controls at the rear of the revamped machine permit operator to move table and to drive stitches without changing hands.

Operator positions stitching head of extended-throat Acme-Morrison metal stitcher and drives stitches through a 0.40-inch thick aluminum sheet and a 0.72-inch thick structural supporting member without removing hands from the machine. A light-beam stitch positioner and a round-ball marking gage facilitate stitch location

Many Doweling Problems Solved

Use of the Rollpin—all-purpose pressed fit pin made by the Elastic Stop Nut Corp. of America—to solve doweling problems at low cost in industrial applications have been successfully demonstrated in the reciprocating compressors made by the Trane Co. and in the diesel engine assembly at Cummins Engine Co. Inc. In the manufacture of its reciprocating compressors, Trane is using the Rollpin in four different applications: To simplify cylinder assembly, as a dowel in a thrust bearing, as a bracket to support a strip spring and to lock the oil pump drive key on the oil pump shaft.

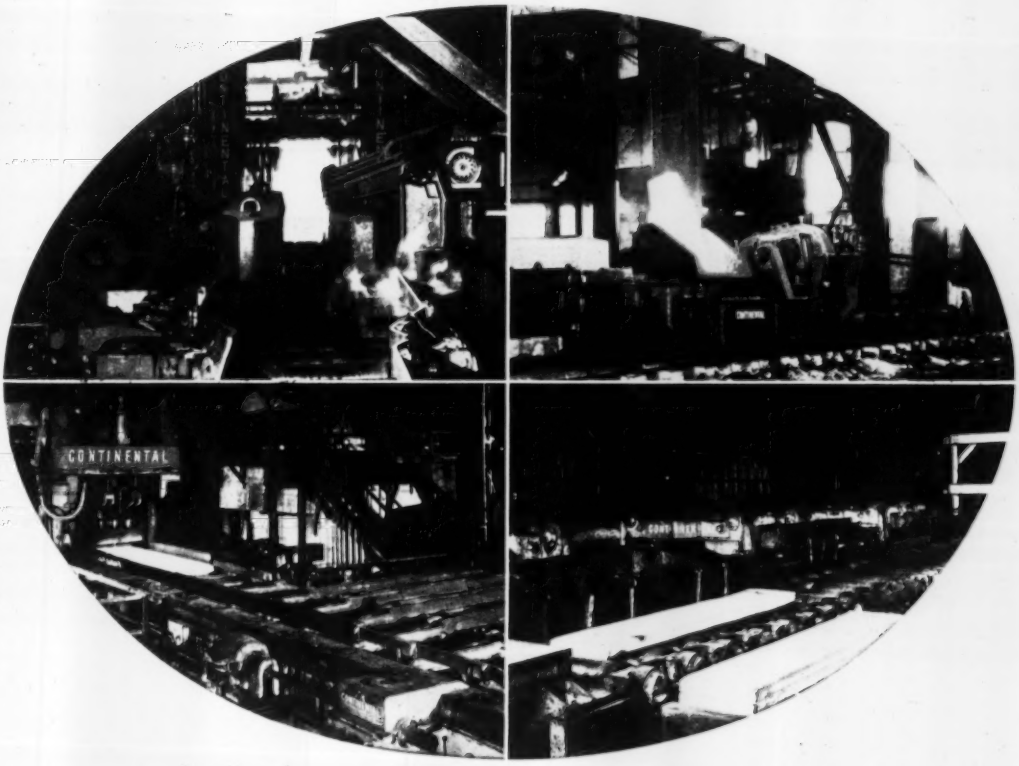
Use of the pin in these applications provides these advantages: Low dowel pin cost, no reaming of dowel pin holes required for accurate dimensional control, no special locking of the dowel pin and easy removal and replacement of dowels without damage to pin or hole. In a similar manner, and with much the same results, Cummins is employing the pin as a positioning dowel in the lubrication pump assembly of its H-600 diesel engine.

The device, designed to provide industry with a replacement for the variety of dowel, pivot, tapered and grooved pins most of which require secondary fastening means, gives engineers and designers a high-pressure, shake-proof fastener that eliminates hole-reaming operations. It is rolled into the shape of a cylinder with a gap or slot which paralles the long axis of the hollow cylinder. The pin is oversize in relation to standard drill sizes, and both ends are chamfered, or beveled, so it can be driven into a hole drilled within normal production tolerances. The slot permits compression of the cylinder as the pin is driven in. The resulting tension, caused by the constant pressure exerted against the hole walls, secures it in position against extreme vibration and shock.

Expansion Joints Widely Used

A catalog containing over 78,000 possible combinations of bellows type expansion joints was recently published by the Solar Aircraft Co., San Diego, Calif. It also contains a complete line of aircraft bellows and assemblies. This 40-page catalog serves as a reference handbook and it illustrates a diversified line of standard and special bellows assemblies used to take up expansion, contraction and offset movements in pipes and conduits.

Several unique designs developed by the company are described in this catalog, as well as many unusual types of bellows applications for the purpose of absorbing motions resulting from pressure or temperature changes in the conducted gases and liquids. These bellows assemblies are manufactured under the trade name of Sola-Flex and range in sizes from ½-inch to 72-inch pipe size covering a complete line of pressures from vacuum to 1000 pounds. Bellows are fabricated from stainless steel and various alloys.



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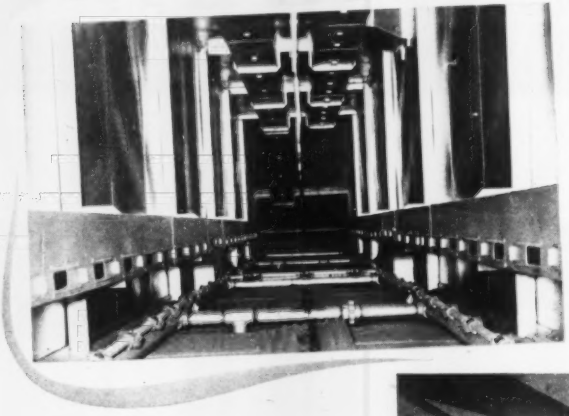
DEAN SPECIALTY WORKS INC., SAN ANTONIO, TEXAS

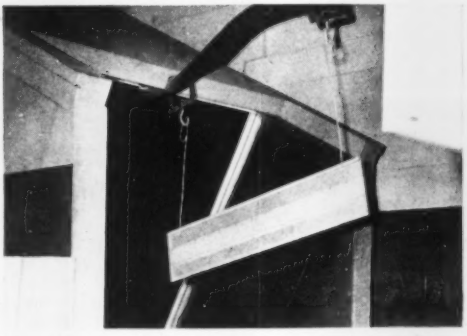
relies on *GAS* fired infra-red Paint Drying Oven for Metal Parts



27 Gas-fired ceramic burners on each side of 60-ft. long infra-red oven provide controlled temperatures of 100 to 600° F. Metal parts for processing are suspended from overhead track.

THE production line of Dean Specialty Works, Inc., San Antonio, Texas, features a 60-foot Gas-fired infra-red drying and enamel baking oven. Known as an A-Type single pass paint drying oven, this Gas oven utilizes ceramic burners which yield the infra-red rays to dry wet-coated metal parts.

These clay burners, manufactured by Burdett Mfg. Co., Chicago, generate temperatures of 100-600° F., depending on baking cycle, pigments used, and color desired. Former baking methods used required more heat, and the enamel surfaces tended toward brittleness. With this modern Gas-fired infra-red equipment, heat is applied from the inside out, producing a coating which is virtually a part of the metal part.



Suspended part is discharged from the Gas-fired infra-red oven.

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RETRACTING FACING TOOL
Eliminates Second Lathe Operation

Remounting of work and expensive secondary operation are avoided by cam-activated swinging blade which retracts for passage through bored casting

By F. E. RILEY
Tool Engineer
London, England

A SMALL company undertook to machine a large quantity of castings in a turret lathe. A penalty clause was attached to this contract and a low price was quoted on the job. Therefore, it behooved the company to complete the work in shortest possible time, with minimum number of operations.

One of the castings is shown in the drawing mounted in the chuck. With ordinary tools it could be bored and faced at one setting with the important exception of its left hand end. This had to be machined so as to hold overall length within close limits.

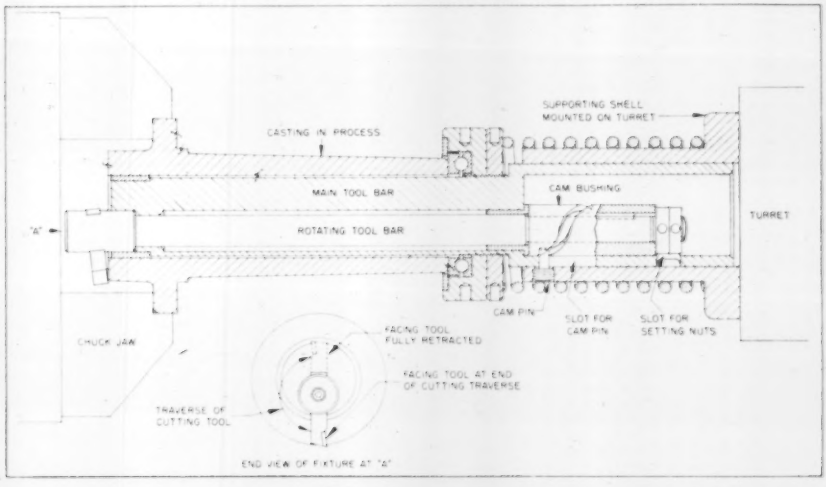
No Second Operation—A separate end facing operation, secondary to boring and turning, would have been expensive since the casting would have had to be remounted on an arbor so as to insure that its end face would be square with bore. Arbor mounting of work often takes longer than actual machining operations.

The problem was solved by a special back-facing device designed so the inner end could be machined without removing the work from the chuck—this after boring and turning were completed.

Heart of the back-facing device is a carbide tipped tool mortised into the end of a small diameter bar rotatably mounted off center in a large bar extending from the turret. When this small bar is rotated through a half circle, it swings the cutting tool around until it is completely within the diameter of the bore of the casting. Tool is shown in this retracted position by dotted lines of end view in drawing.

Takes Facing Cut—After a casting is loaded into the chuck and machine started, slow revolving of the small bar around its axis causes the tool to take a facing cut across the inner end of the casting. Then when this tool again is retracted, the large bar can be withdrawn through the bored casting by backing off the lathe turret.

Main bar supports the smaller rotating tool bar in bearings in its off-center bore. This main bar has a hollow enlargement at its turret end which houses a helical cam bushing. This bushing is keyed to the end of the small rotating tool bar and held in place by nuts which also serve to adjust end clearance of the rotating bar. Large end of the main bar is slidably supported in a bored socket in a cast member which is bolted to a face of the turret. Rotation between these two members is prevented by a cam pin



End facing device in action on casting in turret lathe. Swinging tool is ready to retract at completion of cutting cycle

screwed into the support casting. This pin passes through an elongated slot in the wall of the large hollow end of the main bar and engages the helical groove in the cam bushing.

Thus, when the main bar slides to and fro in the bore of its supporting casting, rotation of the cam bushing and of the tool bar to which this bushing is attached, results. Length of this sliding movement is restricted to approximately 1-inch by closed ends of cam pin slot in the shell of the main bar.

Automatic Feed—Action of other parts of this back-facing device can best be explained by describing how it is used. After boring and turning of a casting have been completed, turret is indexed to bring this back-facing attachment in line with the work. In "free" position, the heavy compression spring surrounding the supporting member on the turret extends itself and the main bar will be pushed as far to the left as is permitted by travel of the cam pin. This pin then is engaging with the right hand end of helix in cam bushing and cutting tool is in "retracted" position. Main bar next is traversed down bore of casting until ball thrust race, mounted in a cup screwed on the main bar, makes light contact with outer face of the casting. Thereupon the automatic feed of turret carriage is engaged.

Turret travel to the left presses the ball thrust race against end of the casting causing main bar to be held stationary. Continued leftwise travel of turret causes supporting member on the turret to slide over the end of stationary main bar. This compresses the coil spring and at the same time causes cam pin to revolve the cam bushing. Facing tool at the outer end of the rotating bar thereupon describes a circular path which traverses its cutting edge over the end of the casting, thus machining off the excess metal.

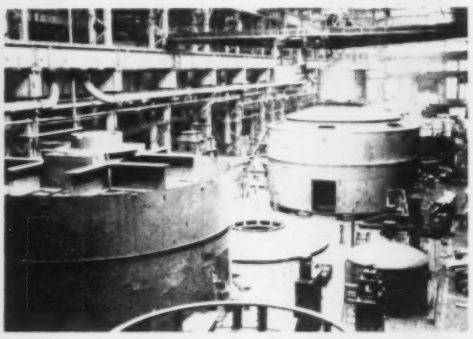
After this facing cut is completed, automatic feed is disengaged and turret is slowly backed off by hand. Pressure on main bar continues to be exerted by compression spring so that it retains its position in bore of casting until cutting tool is retracted completely. Main bar by then has slid as far as possible to the left, within its supporting casting, and the cam pin will be engaging with the right hand end of its slot. Continued backward movement of lathe turret will result in withdrawal of main bar from the bore. Casting now is completely machined.

Length Predetermined—Housing of the ball race is backed up with two lock nuts. Adjustment of these members on the main bar will alter the distance between facing tool tip and thrust race, and thereby predetermining length of the machined castings.

Cost of this back-facing device was not as great as the drawing might indicate. No heat treatment was necessary for the main details. They all were constructed of mild steel with exception of supporting casting on the turret and the hardened guide ring pressed on the outer end of main bar. Cam pin of course, was another hardened part.

The long eccentric hole through the main bar did not require especially accurate drilling. Ends of this hole are finish machined in line, the right end carrying a bronze bushing. Wall of large end of main bar end is slotted radially to admit a pin bar for adjusting nuts on end of the small bar.

Two of Big Three Near Completion



EXCITER housing is being put in place by an overhead crane on one of three 30,000-kva outdoor hydro generators being built by General Electric Co.'s large motor and generator department at Schenectady, N. Y., for Idaho Power Co. Units weigh more than 390 tons apiece, measure 107 feet around the base and stand 28½ feet high. Shipment will be made this fall for installation in the C. J. Strike hydroelectric development located on the Snake river near Boise, Idaho. These big units plus three smaller machines supplied by GE will add 150,000 kva to the western firm's capacity

Vacuum Impregnation Explained

Vacuum impregnation, which introduces an impregnating agent into a chamber where a high vacuum has been drawn, is a versatile process used in many fields. It permits treatment with impregnants of many materials which would be difficult or impossible to treat satisfactorily under atmospheric pressure.

Not only is the vacuum-impregnated product improved as compared with similar products impregnated by ordinary dipping or soaking, but in many cases the saving in time is very important.

A 32-page brochure on vacuum impregnation is available upon request to F. J. Stokes Machine Co., 5500 Tabor Rd., Philadelphia 20, a leading manufacturer of high-vacuum pumps and vacuum processing equipment.

Wage-Hour Law Analyzed

A booklet of interest to every employer who does business in interstate commerce is released by the Cincinnati Time Recorder Co., Cincinnati, manufacturer of time recorders, job cost recorders, master program control units and other time control devices. A digest of the federal wage-hour law and recent amendments, the booklet is entitled "In The Dark About The New Wage Hour Law?" According to C. F. Steinmetz, vice president in charge of sales, it reveals the answers to hundreds of questions for which business men should have the answers, to avoid violation of the law.

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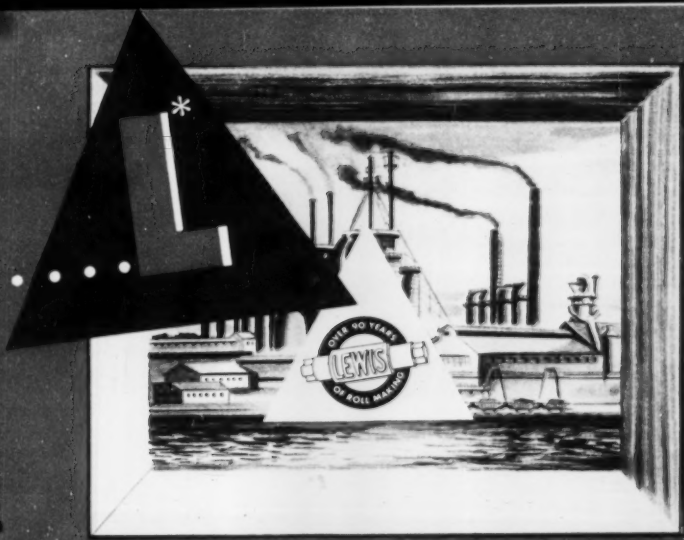

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Write for your copy of Cross Hatch on MICROHONING ABRASIVES

Industry's Rust Loss Bill Can Be Reduced

By GEORGE A. DAUBERT
President, Nox-Rust Chemical Corp.
Chicago

RUST and corrosion account for the needless waste of millions of dollars worth of steel and other ferrous items that are already critically short. "Needless" is the exact word because methods are available to reduce or virtually eliminate this toll.

Raw materials, fabricated parts and finished products are all subject to rust and corrosion but research has produced techniques for ample protection. It is difficult to think of any product that does not have a rust preventive method specifically designed for its classes.

Worth Investigating—Newest and most revolutionary of all the techniques is the wrapping or shrouding of metal in special paper which has been impregnated with a volatile chemical inhibitor. Under humid conditions a rust inhibiting chemical vapor is given off by the paper, which permeates the air of the package and prevents the moisture from causing rust. This vapor will travel as far as 12 inches so it is not necessary for the treated paper to be in contact with the metal.

Advantages of this method are that time and manpower do not have to be used to apply and then remove coatings. Shipments which are protected with volatile, rust inhibiting paper, such as the Nox-Rust Vapor Wrapper, arrive in factory-fresh condition and are ready for use. This is a merchandise advantage capitalized on by manufacturers and shippers who use this technique.

Blue-Chip Customers — Volatile, rust-inhibiting papers have proved their value in protecting products such as agricultural implements, gears, bearings, aircraft engine parts, office equipment, and bar stock. Allis-Chalmers, American Chain & Cable, Caterpillar Tractor, General Electric, International Business Machines, International Harvester, and B. H. Aircraft are among firms which use the protective covering.

In addition to this method of rust prevention, special oils and compounds are available for a wide variety of metals, machines, and parts, shipped or stored in every conceivable way. Manufacturers of these rust preventives have really gotten down to cases, specifying, for example, preventives for indoor storage for six months, outdoor storage up to 12 months, for storing in an unheated shed, for bin storage for three to five years, and for many other situations.

Some rust-preventive compounds are designed to remove fingerprints from surfaces; others are made for light and heavy parts. When a bright appearance is desired for an article, transparent coatings are used.

Guesswork Eliminated—It wasn't too long ago that rust prevention was a haphazard operation. Lard oil, crankcase drainings, or just about any greasy substance was slapped on metal products by guesswork. But by 1940, scientific rust prevention was well established as a specialized field and several firms were turning out preventives for industry. The new rust preventives contained special rust inhibiting additives and were many times more protective than regular lubricating oils or greases.

World War II provided the greatest stimulus ever given to precision methods of rust prevention. Problems of rust and corrosion were more acute than those which had ordinarily confronted industry. Weapons, machines and parts accompanied troops into locations determined by the course of the war, rather than by ideal weather conditions.

Moist tropic heat, desert sand storms, Arctic blizzards and corrosive ocean salt air threatened the usefulness of metal products. The armed services and producers of rust-preventive products, faced with this threat, got together to map out a program of effective protection of weapons and machinery. A cooperative exchange of technical knowledge, research, and manufacturing skill followed, and exacting standards for preventives were drawn up. The results not only benefited the fighting forces during the war, but the stepped-up development of rust prevention on an organized basis has paid dividends in increased efficiency of protection for industry as a whole ever since.

Wrong Idea — In the light of technical advances in this field, it is strange that there are still some firms whose management looks on rust prevention as merely incidental—a sort of gilding-the-lily operation that requires little or no skill or care. Actually, rust prevention must be considered as important as any step in the manufacturing process. Any machine,

Air Conditioning Facilities Added

CRANE cab coolers are manufactured in facilities added in Pittsburgh by Dravo Corp. and the same shop is also used to service and maintain the growing number of the company's air conditioning units in the busy industrial area. About 50 production and service employees will staff the 19,500 square foot addition

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Mill Motor Control

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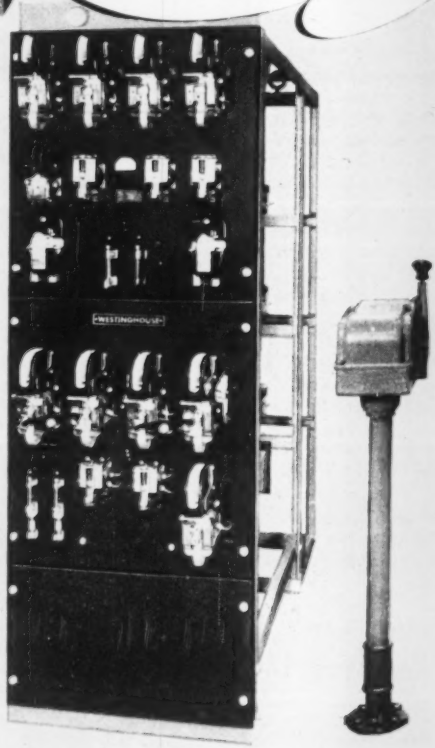

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Controllers, too, are built to assure new dependability. Main contactors are the new Type M with knife-edge, trouble-free bearings . . . with exclusive Quick-Quench arc boxes which greatly increase contact life. Overload relays are the dual thermal instantaneous type. Accelerating relays are the time-proved inductive time delay Type AZ.

The third part of this control team is the rugged Type SM master switch. Easy to operate, yet with a definite "feel" for each operating point of position, the switches are available with 2 to 6 speed control.

Together, these three offer a new kind of dependability. Get the facts on all three. Ask your nearby Westinghouse representative for a copy of the new booklet B-4730, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-21647

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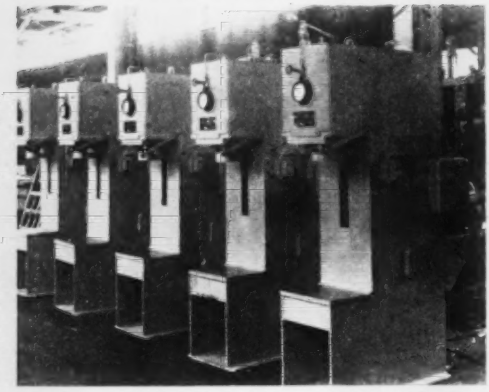

THIS battery of five hydraulic "gas check" presses was recently manufactured by Elmes Engineering Division, American Steel Foundries, Cincinnati, and shipped to a large naval ammunition depot. The C-frame presses, with double-action ram, will be used in ammunition assembly. After the live fuze is inserted in the shell, soft metal sealing plugs are compressed into the shell case under high pressure. This assures that the powder flash will not prematurely explode the projectile. These units have double safety levers, both must be actuated before the press mill closes

tool or part, no matter how well made, becomes a piece of junk if corroded beyond use.

In considering rust preventives, we list four general types: Solvent-dispersal coatings, hot dip compounds, rust-inhibiting oils and the volatile, chemically treated papers. The most generally used rust preventives are of the solvent-dispersal coating type. They contain varying amounts of solvents, depending on the specific use for which they are assigned. These compounds are ordinarily of low viscosity at room temperature, which permits application by dipping, brushing, or spraying.

There is considerable variety within this class, and the coatings formed may be oily, varnish-like, wax-like, or have a combination of these qualities. No controlled heating apparatus is required, and these products will produce a uniform coating on the part regardless of its size. In most cases, a wax-like coating is preferred because it clings tightly to metal and does not tend to drain away during hot weather.

Variety of Coatings—These coatings range from a black opaque material which withstands severe weather, to a light type for limited exposure of two to three weeks. Between these extremes are a wide variety of products with varying film thicknesses and many different degrees of protection.

In most uses, grease or petrolatum type rust preventives are applied in a dipping operation at temperatures ranging from 160°F to 200°F. The compounds vary in consistency from that of a firm wax to that of vaseline. Especially useful on bearings, axles, transmissions and other parts are the softer types because they are easily removed.

Melting temperatures should be considered carefully in selecting this kind of preventive, because the air temperature in some areas may be higher during storage or shipping than the melting point of softer compounds. These materials can also be heated and brushed on, or sprayed through heated guns. When only a small area of a larger machine is to be coated, brushing is usually preferred, especially when it is a portion of a machine too large for dipping.

When metal is not exposed to the weather and the storage period is relatively short, oil type coatings are desirable. Sleeves, rods, pistons, sheet steel and wire are examples of products generally protected this way. Coatings applied to sheet steel do not interfere with processing such as drawing or stamping.

Safeguarding Engines—Another popular use for oil type coatings is in protecting the interiors of internal combustion engines. A number of these products not only prevent rust but are good lubricants as well, and serve as break-in oils for auto and airplane engines.

Oil-type coatings blend with other lubricants so there is ordinarily no need for removing them. Thus they are often applied to the interiors of gear housings, transmissions, carburetors, and pumps.

Rust preventives have proved their usefulness in war and peace, and the great variety of methods are applicable for almost any conceivable shipping or storage problem.

Lightweight Diesels Designed

A report on lightweight, high speed diesels by Cummins Engine Co. Inc., Columbus, Ind., was highlighted in a paper presented by N. M. Reiners during the Society of Automotive Engineers summer meeting. Reiners, manager of the Cummins Research Laboratory, described the experimental six cylinder, 401 cu in. engine, which develops 345 hp at 4000 rpm.

He emphasized the engine is purely an experimental model and currently is not intended for production. The experiments, he said, had demonstrated that the present highly developed diesel engine is still far from its ultimate limit.

He also stressed: 1. A truly "high speed" diesel with increased flexibility in operation is a future probability. 2. The diesel engine's power can be stepped-up, both by increasing the speed and increasing the output per cubic inch of displacement. These factors also contain the possibility that engine size and weight can be reduced for given power outputs. 3. Using commercially available fuels, smokeless and efficient high speed combustion can be secured by projecting the same basic equipment and rules.

4. Aluminum can be assigned a role in the development of lightweight in high specific output and high rpm diesel engines.

Reiners credited the four-valve cylinder head as a major factor in making the 4000 rpm operation possible. He said:

"At one stage in the development, the maximum bhp was developed at 3300 rpm with a two-valve head. Changing to the four-valve head added 40 bhp at the same speed at equal exhaust smoke limits, and pushed the speed of maximum horsepower output up to approximately 3700 rpm."

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Federal-Mogul solved this by installing 10 Dravo *Counterflo* Heaters at strategic locations in the foundry. Mounted horizontally or vertically, each heater, equipped with automatic modulating controls, produces 22,000 cu. ft. of even temperature air per minute. Heaters are shut down at night, but heat the building quickly next morning. In summer, the units are used for fresh air ventilating.

RESULTS: Normal atmospheric pressure maintained, facilitating exhausting of heavy gases; improved comfort; healthier working conditions; increased worker efficiency; improved morale, better production records!

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- Automatic Control . . . on-off or modulating controls.
- Long service life, low maintenance . . . stainless steel combustion chamber.
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We will be glad to send you more information about heating and ventilating with Dravo *Counterflo* Heaters. Write today for Bulletin No. PQ-526-798

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S. P. Kinney Engineers Inc.
Carnegie, Pa.

E. W. Voice, British Iron & Steel Association, London, has reported in STEEL (September 10, 1951, p. 102) on the use of radioactive tracers and blast furnace research. This is an important piece of research because it deals with the time required for gas to travel from the tuyere level to the stock line and the rate of lining wear.

Rate of travel of the gas from the tuyere level to the stock line is closely associated with the improvement in gas solid contact in the shaft.

Mr. Voice reports 3 to 8 seconds to travel to the top of the stock, equivalent to velocities of 22 and 8 fps, while my measurements here indicated rates of 70 to 450 fps. I believe that the velocity results as reported by Mr. Voice are low, probably because the measurements were made above and not in the stock.

Free Area—If we consider the two values for velocity given by Mr. Voice of 22 and 8 fps from the standpoint of the free cross sectional area available for flow on any plane we will come out with some very large values for the free area. Take, for example a furnace blowing 60,000 cfm equivalent to 84,000 cfm of gas at N.T.&P. Velocity of the gas at N.T.&P. above a 17-foot stock line would be 6.2 fpm.

If the velocity were 22 or 8 feet per second (1320 fpm and 480 fpm respectively) and other conditions remain the same then the free area would be:

$$\frac{84000}{X} = 1320$$

$$1320X = 84000$$

$$X = \frac{84000}{1320} = 63 \text{ sq. ft. free area}$$

or $\frac{63 \text{ sq. ft.}}{226} = 28.3\%$ cross sectional free area equivalent to 22 ft. per second.

and equivalent to 8 feet per second (480 feet) per minute the free area would be:

$$\frac{84000}{X} = 480$$

$$480X = 84000$$

$$X = 84000 = 175 \text{ sq. ft.}$$

or $\frac{174}{226} = 77\%$ free area.

cross sectional free area available for flow.

Free area in the stock column on the given plane would therefore have to be of the order of 28.3 per cent and 77 per cent in order to justify velocities of 22 and 8 fps. These free areas are obviously too high when compared with planes through packed towers.

It is pointed out by Mr. Voice that my observations were made in the stock column with a pitot tube. This tube was made of a 2-inch diameter boiler tube, water cooled, equipped with small tubes inside.

Calibration of Equipment—A careful check of the pitot tube measurements was made on a large scale laboratory test after the field experiments were completed. In these calibration tests, a large size blower was used to pass air through a column of stock, consisting of ore, coke and stove. These materials were taken from one of the furnaces, under observations. The same pitot tube was employed. Knowing the area of the column, the volume of air blown, the velocity readings were then used to determine the free area of the stock on a given plane. These values were then employed as a check on field records.

From the above, I feel that the velocities as shown in Mr. Voice's results are low because of the location of the point of measurement above the stock. If the tests are made within the column of stock, I believe results will be comparable to observations made here.

Mr. Voice is to be congratulated on the work he has accomplished in connection with various measurements, having to do with the interior of the blast furnace. I believe this work will lead to better methods of determining what is going on in a blast furnace and is a great help to material industry.

Iron Hand Uses Gives

Advantages of automatic unloading of power presses with the Sahlin Iron Hand are described in an eight-page catalog just issued. Three sizes to suit large, medium and smaller presses are available. Illustrations show how the device can be adjusted to different widths, heights, jaw travel and distance.

Installation and operation instructions and parts lists are included. Copies may be obtained by writing to Sahlin Engineering Co., 267 Ferndale St., Birmingham, Mich.

Ramps Head for Fairless Works

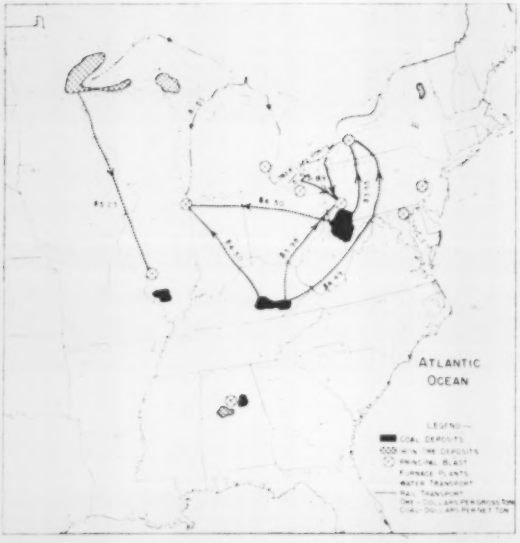
ENTERING the Pennsylvania Turnpike at Irwin are a dozen two-way hydraulic loading ramps made by Superior Railway Products Corp., Pittsburgh, and destined for immediate installation at U. S. Steel Corp.'s Fairless Works. They will be placed in the oil storage building and the large central storeroom building but will be used at first to unload equipment and supplies for the plant's operation. The ramps can be raised as much as 18 inches above the platform or lowered 9 inches below and are locked in place when the proper level is reached

Potential Sources of Iron Ore Bolster Conservation Program

By OWEN R. RICE
Metallurgical Engineer
Freyn Engineering Dept., Koppers Co. Inc.
Chicago

IRON ore requirements in 1950 were filled by the production of approximately 118 million net tons. This rate of demand is likely to continue into the foreseeable future. It may even increase. Seventy-five per cent, or about 89 million net tons, came from the Great Lakes region. About 20 million net tons or 17 per cent were mined in the eastern, southeastern and western parts of the United States. The reserves in these areas are ample to maintain the iron production in the districts they serve for a great many years to come, even allowing for considerable expansion in local iron-producing capacity with consequent increase in ore requirements. However, these ore reserves in the east, south and west of the U. S. are not likely to occupy more than a substantial minority position in the totality of ore requirements of the country. Eight per cent, or about 9 million net tons were imported, principally from Chile, Cuba, Spain, Sweden, Newfoundland, Africa, Mexico, Brazil.

Lake ores contained, on the average, 50 per cent iron (natural), and probably not over over 9 per cent silica, a general grade of analysis which has characterized the lake ores for decades passed. In recent years, as the prime grades of natural ore have become less plentiful, the above standard of analysis has been maintained, in the average of shipments from the lake region, by a substantial component of washed, jigged, and other gravity-concentrated ore—21,600,000 net tons in 1950; almost 25 per cent of the total lake production.



Main coal and ore deposits and major blast furnace districts in eastern half of United States

During the last ten years, many warnings have been sounded that lake ores are nearing exhaustion. The figures published for taxing purposes registering the reserves of high-grade lake ores which can be won by high-speed, low-cost, open-pit mining, show about 600 million tons; for similar high-grade ores but which can be won only by slower, more costly underground mining, another 600 million tons; total, 1200 million tons. For reasons having to do with taxation, both of these figures can be regarded as conservative.

It is true that if we produced all of the 89 million tons annually from the open-pit mines only, the reserves based on the tax figures would be exhausted in six or seven years. Actually, we have been securing over 25 per cent of the production from underground mines, and the efficiency of modern earth-moving equipment is turning underground workings into open pits to a degree unthought of a few years ago. At least there is reason to believe that the high-grade lake ores are good for a span of time in the category of 25 years, if the current rate of demand upon these ores were sustained. This is not very long but it offers time to establish measures to relieve the draft upon, and to extend the life span of these natural high-grade ores of the lake region.

In this same region are large deposits of iron-bearing taconites which contain between 25 and 35 per cent iron. Some veins are magnetic, others are non-magnetic. Commercially feasible means for concentrating the magnetic taconites to a 63 per cent iron product have been established, and large-scale installations are already in project. In 1950, 69,500 net tons of magnetic taconite concentrates were produced in sizable pilot plants. D. B. Gillies, mining consultant, Republic Steel Corp., reports that there are probably 2000 million tons of 63 per cent iron concentrates represented in the quarryable magnetic taconite deposits in one ore range alone. This figure is equivalent to 2500 million tons of the 50 per cent iron lake ores previously discussed, and would potentially extend the life of the lake region to 50 years.

Large reserves of high-grade ores have been proved in Venezuela and in Labrador. Measures are under way to win 10 million tons a year from each of these deposits, with projects for eventually doubling these rates. If 30 million annual tons of eventual imports are applied to reduce the 90 million-ton yearly demand upon the lake ores to 60 million tons, the life of the apparent 5000 million tons equivalent reserve of the latter, in natural ore and taconite concentrates, approaches the century mark.

W. C. Rueckel, vice-president, Koppers Co. Inc., joins with other competent estimators in appraising

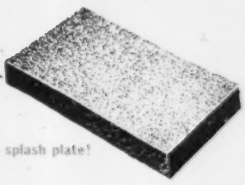
WHEREVER THE HOT STUFF HITS

USE NATIONAL CARBON

TRADE-MARK

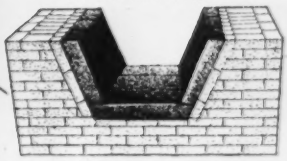
For the cinder notch liner!

For the cinder notch plug!

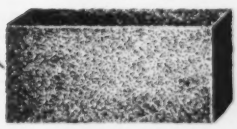


For the splash plate!

For the runout troughs!



For the skimmer plate!



● "National" carbon is now firmly established for blast furnace linings. It is being used outside the furnace as well—wherever there is contact with molten material—for the splash plate, runout troughs—clear down to the ladle—skimmer plate, cinder notch liner and cinder notch plug.

The reasons?

"National" carbon has no melting point. It is highly resistant to slag attack and thermal shock . . . not wet by molten metal . . . has a low thermal expansion . . . and maintains its mechanical strength at elevated temperatures.

Use "National" carbon inside and outside your blast furnaces and you cut down maintenance, speed up production and save money. For more information, write to National Carbon Company, Dept. S.

The term "National" is a registered trade-mark of Union Carbide and Carbon Corporation

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A Division of Union Carbide and Carbon Corporation

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FREE BULLETIN on Scientific Materials Handling. Write for "Industrial Logistics" and name your product.

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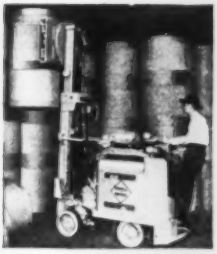
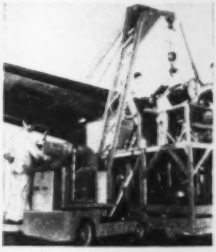
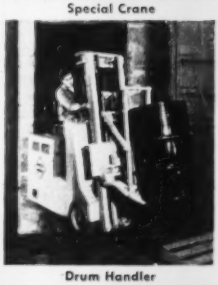


Roll Clamp



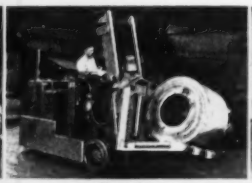
Special Crane



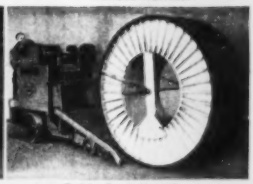
Drum Handler

Die Handler

Pallet Retriever



Upender



Cable Reel Handler

Side Dump Revolving Unit

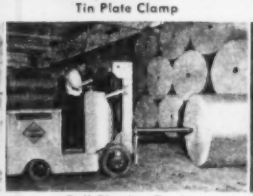
Roll Handler with Apron

Tin Plate Clamp

Bale Clamp

Twin Coil Handler

Rotary Scoop



Roll Piercing Truck

3-Ton Low Lift; 1-Ton Crane

the actual iron ore reserves existing in the world at 35,000 million tons. At the current rate of ore consumption, he finds that world-wide exhaustion might be faced in about a century and a half.

In view of the patently speculative nature of all estimates and prognoses of the sort, and in view of other circumstances, the arithmetical figures that point the possibility of the U. S. running out of iron ore a neat 50 years ahead of the rest of mankind do not come with too severe emotional impact. The iron ore supply situation for the United States calls for energy and enterprise, but it is neither grim nor hopeless.

Operating statistics applying to over 100 blast furnaces in the U. S. show that about 635 pounds of sinter were charged in 1950 per net ton pig. Upon a total production of 66 million tons of pig iron, the total sinter use would appear to be about 21 million net tons.

Sinter-producing capacity as of mid-1950 was about 22 million net tons. The fact that sintering plants of the iron industry were operating at about 95 per cent of capacity, signifies the importance attached to that factor of ferrous materials benefication. There is now a resolute campaign against the charging of fines into the blast furnace. Considerable flue dust is involved in the total sinter production, but the bulk of the sinter mix is fine ore. At one large furnace plant all ores are screened and most of the fines under ⅜-inch size are sintered.

Conversion costs (cost above materials), including ignition fuel, at several sintering plants amounted to the approximate figures shown in the accompanying table.

Some of the cost differences between plants reside in the contrasting amounts directed to depreciation, as shown in the right-hand column.

Taconite concentrates present a problem in agglomeration. The extreme fineness of the product may not preclude the use of the down-draft sintering process, but it does introduce a rather critical measure of difficulty for that system of agglomeration.

Pelletizing has been under large-scale experimentation for several years. There seems not yet attainable a grade of pellets possessing reliably a degree of physical stability sufficient to sustain them through the rigors of handling in shipment from plant, to vessel, to rail, to bunkers, to furnace.

Other schemes are under consideration for bringing to heel these elusive concentrated taconite powders, such as briquetting with portland cement or other binder, mixing with coal or other carbonaceous caking material to form an iron-bearing coke, and nodulizing process using a rotary kiln. This latter system, on a large pilot basis, will presently be in run, not perhaps, on taconite concentrates, but more likely on the ultra-fine component of marginal lake ores. The rotary kiln has been in and out of the iron-ore agglomerating picture for many years.

Blending of ore stocks has been found useful in regions where winter freezing conditions are not so severe as to interfere with the functioning of the reclaiming equipment. Such a mechanical system of blending, however, has not been found necessary at all in the case of lake ores shipped by vessel. The routine of railroad-car sampling between mines and loading docks, and the orderly spouting out of the dock bunkers into the hold of the ore vessel, has, for a great many years, effected a degree of blending that permits the delivery of cargo lots of ore on a guaranteed analysis basis.

CONVERSION COST OF PRODUCING BLAST FURNACE SINTER —YEAR 1950

Plant	Sinter Produced, N.T.	Type	Total Conversion Cost/N.T. Sinter	Provision for Depreciation
A	1,760,000	Pallet	$0.95	$0.07
B	710,000	Pan	1.45	0.17
C	50,000	Pallet	1.65	0.30
D	800,000	Pallet	1.95	0.59

From a paper presented at the 1951 general meeting of the Iron and Steel Institute, London.

Planned Care Stretches Belt Life

Theme of a conveyor belt maintenance program being conducted by Cambridge Wire Cloth Co., Cambridge, Md., is "Planned Care Means Longer Belt Wear." It is aimed at better maintenance of woven wire conveyor belts in high temperature installations to stretch belt life during the current period of metal shortages. These shortages, of course affect the delivery of replacement belts when original equipment wears out.

Program combines intensive field work by the Cambridge staff of sales engineers with a series of mailings to users of woven wire conveyor belt for such installations as heat treating, annealing, sintering, etc. Each mailing contains general data on woven wire conveyor belts plus a specially prepared belt hint on one or another phase of belt maintenance. Hints so far have dealt with proper methods in installing a belt, standardization of belt specifications and special service facilities. Later mailings will feature stress relief of new belts, the value of protective oxidizing treatments and others.

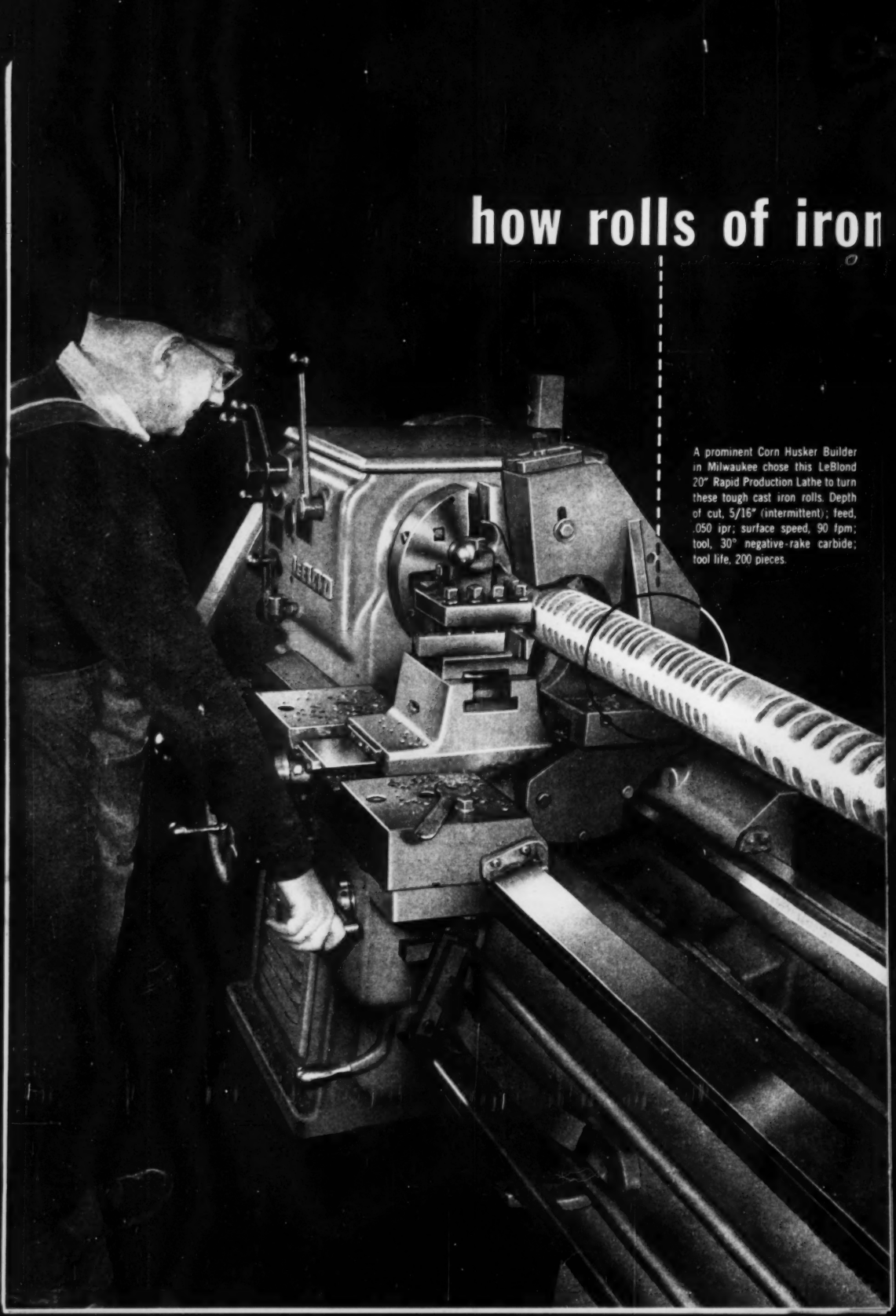
Flood Damage Repaired Quickly

Electric heaters proved they could take care of themselves and help get a waterlogged plant going again in a hurry following the summer floods in the Midwest. Here's how the job was done when waters receded at Sealright Co. Inc., Kansas City, Kans., container manufacturers.

Four Cromalox radiant heaters made by Edwin L. Weigand Co., Pittsburgh, and normally used to dry ink on cardboard were rewired in series and allowed to dry themselves at a low heat. They were then installed in a temporary insulated plywood oven. An electric fan was used to circulate air in the oven, making it possible to hold the temperature constant at 200° F.

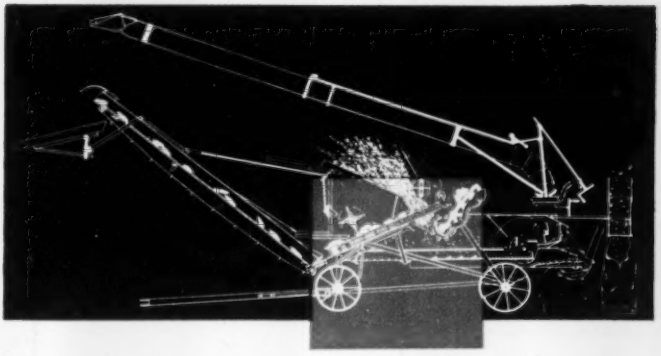
Operating continuously 24 hours a day, the oven dried 300 motors (75 per cent of the plant's total) and various other equipment in little more than two weeks. After that, the adaptable radiant heaters were easily and quickly returned to their former occupation.

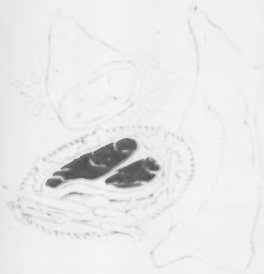
how rolls of iron



A prominent Corn Husker Builder in Milwaukee chose this LeBlond 20" Rapid Production Lathe to turn these tough cast iron rolls. Depth of cut, 5/16" (intermittent); feed, .050 ipr; surface speed, 90 fpm; tool, 30° negative-rake carbide; tool life, 200 pieces.

help put meat on your table





At the heart of machines that husk corn and shred the stalks into fodder are iron rolls like these! They help the farmer convert his crop to feed for livestock—the steers and hogs that become tender steaks and juicy hams for your table.

A prominent Milwaukee builder of husker-shredder machines for more than sixty years, needed a production lathe to turn these rolls . . . a lathe rugged enough to take the beating of a 5/16" intermittent cut at .050" feed and 90 surface feet per minute, and to withstand the forces of a 30° negative-rake carbide tool, cutting iron hardened by casting around a steel shaft!

On the recommendation of LeBlond's Chicago Office, they put a LeBlond 20" Rapid Production Lathe on the job. Result? *Three and a half years of rough yet trouble-free production . . . and many more to go!*

A LeBlond 20" Rapid Production will give you high production turning of a *variety* of work within the range you choose. It offers two speed ranges, 45 to 300 rpm or 67 to 450 rpm, and 18 feeds from .005" to .150".

Not a converted engine lathe, it has no quick-change box or leadscrew, expensive features unnecessary for production work.

Whether you're turning rugged rolls or precision shafts, there's a LeBlond Lathe to turn them faster, better. Your LeBlond Distributor will tell you about the 20" Rapid Production and other late models. Call him or write—

THE R. K. LEBLOND MACHINE TOOL COMPANY, CINCINNATI 8, OHIO

Ask for Bulletin RP-220 G for more information on the 20" Rapid Production Lathe.

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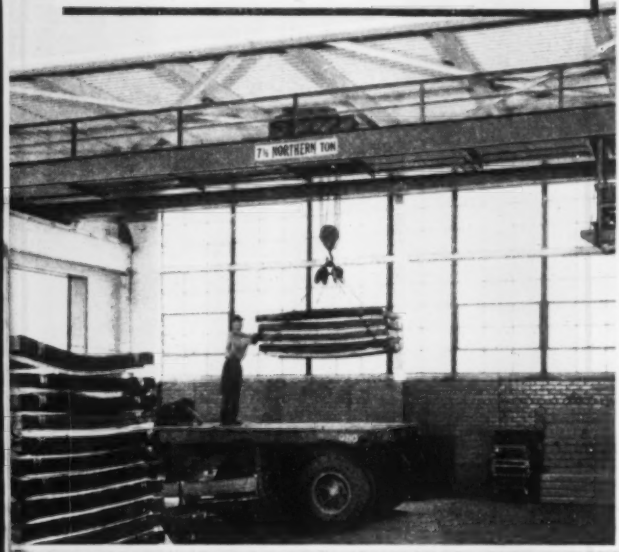
LeBLOND *of Cincinnati*

WORLD'S LARGEST BUILDER OF A COMPLETE LINE OF LATHES • *FOR MORE THAN 63 YEARS*

NORTHERN HI-LIFT CRANES

keep them rolling!



WHETHER handling strip, sheet, plate, structural steel or finished parts, a Northern Hi-Lift Crane helps keep your trucks and trailers rolling to make scheduled deliveries; handles big, heavy loads for fast loading; saves time, cost, and ruffled tempers.

For over fifty years Northern Cranes have consistently stressed three essential elements —safety, durability, dependable operation— with ample provision for meeting emergency demands under peak material handling conditions. They keep your production moving and your shipments rolling!

Write for our new Bulletin HL-115

NORTHERN ENGINEERING WORKS

2615 E. Atwater St., Detroit 7, Michigan

OVERHEAD ELECTRIC TRAVELING CRANES AND HOISTS

Titanium Alloys

(*Concluded from Page 69*)

ing agent where there is a tendency for the chip to be welded onto the cutting tool.

In addition to the sulphur additives, some degree of success has been obtained by the use of chlorine additives in mineral oil and fatty oil combinations. Chlorine may be added to cutting oils in the form of chlorinated solvents, such as carbon tetrachloride or trichlorethylene. These materials, however, evaporate rapidly and have dangerous toxic properties.

The sulphur additive cutting oils are effective in preventing welding under severe cutting conditions and at the higher cutting speeds. The chlorine additives are more effective at lower speeds and lighter cuts and also reduce friction. The most satisfactory cutting fluid consists of the proper balance between active sulphur, active chlorine in a nontoxic form and polar-type fat additions for lubricity, combined with a mineral oil of the correct viscosity.

Recommended properties of cutting oils to be used are as follows:

Viscosity	Fat	Active Sulphur per cent	Active Chlorine per cent
150-100 F.	10%	2	3
225-100 F.	10%	2	3
500-100 F.	10%	2	3

Grinding Wheel Wear Rapid—Titanium dust is highly explosive; therefore, wet grinding is recommended wherever possible. Grinding presents the greatest difficulty in the working of this metal. Aluminum oxide wheels have been the most satisfactory, although silicon carbide wheels with a soft bond have been used with some success. In both cases, the wheel wear is rapid, averaging five to ten times the amount experienced when grinding steel with the same rate of cut. In most titanium grinding operations, the rate of wheel wear is about 2 cubic inches for each cubic inch of metal removed.

The chief difficulty in grinding titanium is that the metal tends to smear off and load the abrasive grains of the wheel. To resist this, a water-soluble oil containing antiwelding additive and saponifiable, is preferred.

Offers Fabricating Facilities

"Facilities Available for Military Production" is the title of a new 12-page brochure issued by the Defense Division of Geuder, Paeschke & Frey Co., Milwaukee. The booklet describes in detail G. P. & F.'s complete metal fabricating, finishing and assembling facilities.

New accomplishments with Johnson's wax drawing compounds!

Aircraft Plants—Johnson's #150 Wax Lubricant successfully used in first stretch forming operation ever tried on Titanium sheet.

50% production time cut claimed on wire brush polishing of stainless steel metallic arc welds with Johnson's #111 Wax Lubricant.

Aircraft engine manufacturer reports outstanding success using Johnson's #150 Wax Lubricant forming Nimonic #75 sheet on Cincinnati Hydroform press.

Automotive Plants—Chicago firm advises drawing former troublesome annealed sheet without annealing through use of Johnson's #150 Wax Lubricant.

Michigan plant of large automotive parts supplier applying Johnson's #150 Wax Lubricant to more and more press operations due to successful experience on tough draws.

General Industry—Outstanding success reported by New Hampshire firm using Johnson's #111 Wax Lubricant for impact extrusion.

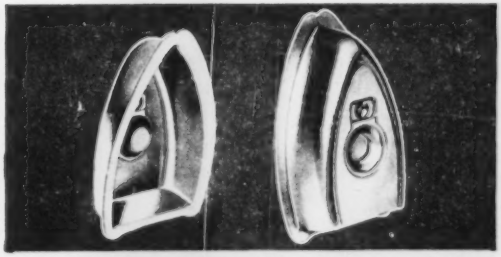
"Better finish on drawn parts . . . never seen anything that works as well tapping die castings as your wax lubricants," says Pennsylvania machine shop foreman.

For complete information on the use of Johnson's Wax Lubricants for deep drawing, tube drawing, cold heading, tapping, drilling, routing, sawing, piercing and blanking, bending, stretch forming, etc., *write*—

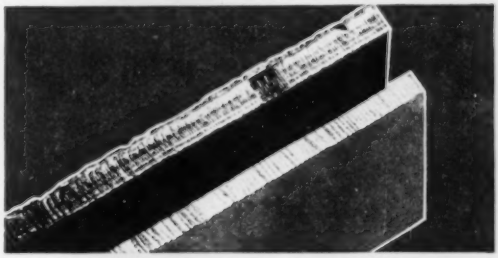
S. C. JOHNSON & SON, INC.

Industrial Products Dept. S10

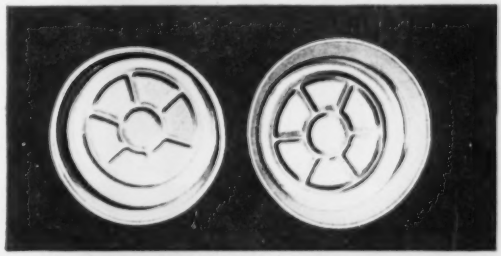
Racine, Wisconsin



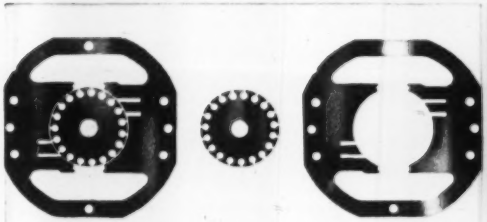
Part for steam iron drawn from #430 stainless steel with 300 ton hydraulic press. Use of Johnson's #150 Wax Lubricant eliminated shutdowns and permitted redesign of die to make draw in one operation instead of three steps formerly required.



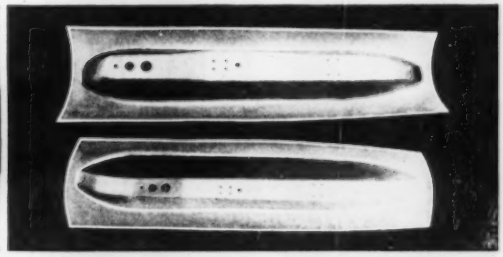
75 ST aluminum pieces cut with Onsrud high speed radial arm router. Conventional lubricant gave 3 cuts per tool—left heavy burr (top view). Johnson's #170 Wax Coolant gave 11 cuts per tool—left no burr—required 50% less pulling effort (bottom view).



Ammunition Powder tank part of .081 gage—3 S O Aluminum drawn and swaged on automatic swaging die. Johnson's #150 Wax Lubricant applied prior to initial draw provides sufficient lubrication for swaging operation.

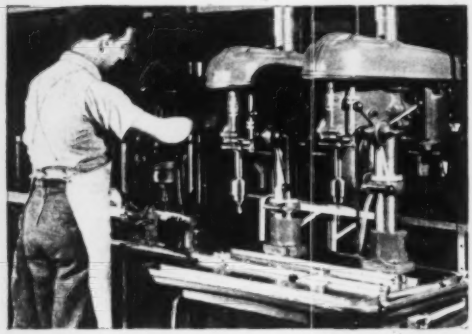


Motor lamination set stamped from electrical sheet. Normal run per die grind—45,000 sets maximum using conventional lubricant. Increased run per die grind to 65,000 sets using Johnson's Wax Lubricant.



Well jettison fuel tank part of .125 gage—61 S O Aluminum formed on hammer die with Johnson's #150 Wax Lubricant providing lubrication. Aircraft firm unable to produce this part satisfactorily prior to use of Johnson's #150 Wax Lubricant.

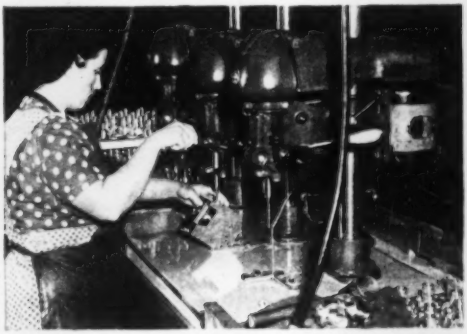
HOW Delta Tools Solved Four Unusual Production Problems



TIME SAVING 50%—PRODUCTION INCREASE 100%

ALBERT SPECIALTY CO., CHICAGO, ILLINOIS

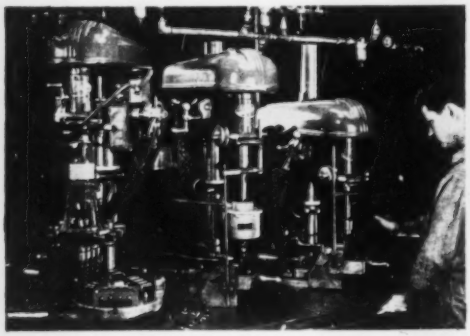
When lack of a 3-spindle drilling machine jeopardized vital sub-contracts on aircraft and signal corps equipment, this company combined a Delta 2-spindle unit and a Delta 1-spindle unit for drilling, countersinking and tapping six holes in each end of a tube used in a signal corps tripod. A special fixture made it possible to drill the phenolic tubing and brass casting simultaneously with different position limits to make tripods interchangeable. Result—a 50 per cent time saving and production increased 100 per cent over the old method.



ACCURATE HIGH SPEED DRILLING—NO SCRAP

OHIO BRASS CO., MANSFIELD, OHIO

To achieve precision accuracy at a cutting speed of 12000 rpm. in drilling and reaming forged aluminum blanks for fuse components, three Delta super high-speed drill presses were installed in sequence. Blanks are passed from one station to the next, and stops on the table make for quick accurate positioning. Scrap has been eliminated.



DRILL AND TAP 160 PIECES PER HOUR

EDWARD VALVES, INC., EAST CHICAGO, INDIANA

To increase production speed and reduce labor costs on valve stop collars, Edward Valves, Inc., installed three specially tooled Delta drill presses. Piece is put in machine at right and drilled, manually positioned but automatically clamped by air on drill downstroke. Center machine does tapping operation. Production rate—160 pieces per hour on both operations. Left machine drills valve lubricant screws with 5/32 drill, 500 pieces per hour, with 95% of operation actual machining time, only 5% for loading.

DRILL PHENOLIC PARTS WITH PRECISION ACCURACY

ACRO MANUFACTURING CO., COLUMBUS, OHIO

Delta Super-Hi speed drill presses solved three serious problems of drilling phenolic switch parts: (**1**) formerly drilled four switches to one bit—now drill 150; (**2**) enlarging holes close to edges of phenolic parts always resulted in 60% scrap because of breakage—with Delta scrap is only 10%; (**3**) drilling a .004 hole to tolerances of plus or minus .0005 formerly required two operations, drilling from either side. Now with Delta it is done from only one side.

There's a Delta Power Tool for Your Job— WOOD OR METAL WORKING

53 MACHINES—246 MODELS—MORE THAN 1300 ACCESSORIES

Your Delta dealer is listed in your Classified Phone Directory under "Tools"

DELTA MILWAUKEE

ROCKWELL

DELTA POWER TOOL DIVISION

Rockwell MANUFACTURING COMPANY

629L E. VIENNA AVENUE • MILWAUKEE 1, WISCONSIN

Foreign Engineers Get Training

American know-how is finding its way into the power plants and engineering firms of India, South America, Egypt, Sweden and nearly a score of other foreign countries through a training program carried on in Pittsburgh by Westinghouse Electric Corp. and Westinghouse Electric International Corp.

In a program which has been developed over the years, young engineers from many nations have been given the opportunity to learn first hand how giant power generators, switchgear apparatus, transformers and motors are built and operate. Currently, some 20 foreign students are studying side-by-side with recent graduates of American engineering schools who are employed by the company.

"Our graduate student training course with its comprehensive view of virtually all company operations is ideal for foreign students seeking American know-how," says M. J. Warneke manager of graduate student training. "While the new employee on the graduate course is discovering which phase of the company's varied activities interests him most, the foreign student is learning the American way of doing things, which will stand him in good stead when he assumes a responsible engineering job in his native land."

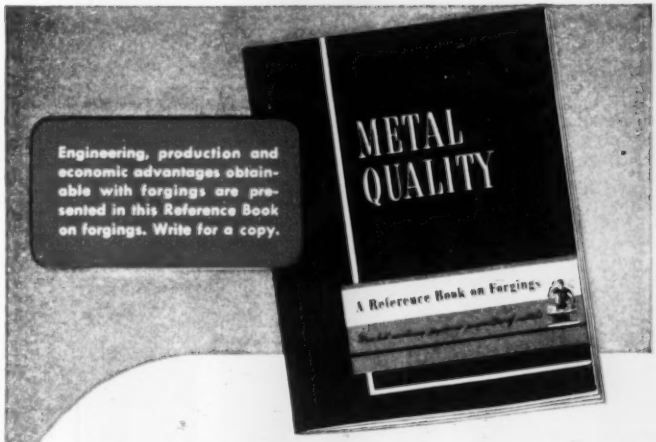
While the program is commercially attractive to the company—trainees return to their native countries with a thorough knowledge of Westinghouse products—only a few of the many applicants who desire training can be accomodated.

Universal Arch Nosing

Arch nosings, in any furnace take a licking. They are always out in front whenever direction of gas flow must be changed, and are always in the corner behind every conceivable obstruction when it comes to cooling their supporting steel girders and castings. According to the George P. Reintjes Co., Kansas City, Mo., the old type angular arch nosing was a source of much grief and constant maintenance cost. It is obvious that the larger the nosing radius, the smoother the gas flow and naturally, less mechanical spalling and less refractory maintenance costs.

The radial type of arch nosing was originally developed by engineers at one of Western Electric Co.'s boiler rooms. This arch was an innovation to which all the suspended arch manufacturers soon subscribed.

Company's original contribution to


Engineering, production and economic advantages obtainable with forgings are presented in this Reference Book on forgings. Write for a copy.
METAL QUALITY
A Reference Book on Forgings

● Attempts to gain the unusual mechanical and economic advantages of closed die forgings without using forgings seldom meet with success. There is no substitute for the combination of strength and toughness inherent in the compact fiber-like flow line structure of forgings. Consult a Forging Engineer about how you can obtain a correct combination of mechanical qualities in forgings for your particular type of equipment.

DROP FORGING ASSOCIATION
605 HANNA BLDG. • CLEVELAND 15, OHIO

Please send 60-page booklet entitled "Metal Quality — How Hot Working Improves Properties of Metal", 1949 Edition.

Name .....
Position .....
Company .....
Address .....

SHENANGO Centrifugal CASTINGS ... KEY TO SAVINGS

How to save time and money on symmetrical parts!

YOU are in line for a double advantage when you turn to Shenango for symmetrical, tubular or annular parts, large or small.

First, such parts are produced by Shenango's advanced centrifugal casting process. This means *tougher* parts because of finer, pressure-dense grain, greater strength, better elongation and freedom from sand inclusions, blow holes and other often hidden defects. It also means less waste, less machining.

Second, Shenango has the modern machining facilities and skilled workmanship to give you semi-machined or finished parts... precisely as specified... at minimum cost! The heavy trunnion bearing shown above is one of the many types of parts, large and small, ferrous and non-ferrous, regularly produced at Shenango.

FREE BULLETINS

Find out if Shenango can help you save time, money and material. Bulletin No. 150 covers non-ferrous centrifugally cast parts; Bulletin No. 151 for parts of Meehanite Metal and Ni-Resist. Either or both are yours for the asking.

SHENANGO-PENN MOLD COMPANY
Dover, Ohio
Executive Offices: Pittsburgh, Pa.

SHENANGO

ALL RED BRONZES • MANGANESE BRONZES • ALUMINUM BRONZES
MONEL METAL • NI-RESIST • MEEHANITE METAL

the art of building radial furnace arches was the hinged nosing support. They knew that the horizontal portion of any arch expands; the pressure is exerted against the nosing. Their hinged nosing moves and eliminates the pressure.

Next step was to build the flat portion of the arch at any slope desired, hinging the arch's nosing so as to be tangential thereto and without a special shape of refractory and/or casting. Changing arch contour is no longer a special engineering problem but a simple field operation that can be easily handled by the plant mason.

Reintjes hinged arch nosing originally designed as a boiler arch is applicable to steel mill heating furnaces. Open-hearth furnaces fantail nosings are particularly vulnerable due to the fact that in many cases the fantail-nose supporting girder also supports the heated uptake wall. This girder is at right angles and in close proximity to the chill wall. In some cases, the girder supports thrust from the chill wall. Heat of this chill wall is readily transferred to the girder.

Engineers know that heat is transferred through the refractory arch supporting castings as much as 45 times faster than through alumina refractories. This simply means that the more and the larger the cross-sectional area of the castings that attach the arch refractories directly to the supporting steel girders, the greater will be the tendency of the arch supporting girder to overheat and warp. At best, it is a difficult problem to properly circulate cooling air through this "forest" of supporting castings.

In open hearth or other melting furnaces, entirely new and more difficult problems are encountered. For instance, in one furnace, the operator may desire to use high alumina refractories. In the next furnace, the use of basic refractories may be specified.

Reintjes arch nosing design permits use of any type refractories whether of high alumina, silica or basic. As the standard shapes of arch nosed tiles are built up in multiples of 15 degrees, a 180-degree or semicircle arch can be formed. Through this design, alumina refractories can be replaced at any time with basic refractories, either plain or metal-clad, without the change or relocation of a single casting or girder. The same design of nosing can be used as a fantail nosing, a curved portion of the chill wall of an open hearth, or wherever nosings are required in any heating furnace, roof, and similar locations

is light weight important to your product?

Torrington Needle Bearings contribute to weight-and-space-saving design in many products.

For any given load, Needle Bearings weigh less and require less radial space than any other type of anti-friction unit.

Needle Bearings also permit weight savings in related components. Only a bore machined to proper dimensions is required for the housing and no spacers or retainers are needed.

So, if your product can benefit from light weight, let our engineers help you utilize the weight- and space-saving advantages of Torrington Needle Bearings.

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Made Easy!

When speed reduction requirements are within the fractional through 85 hp range, there is no selection problem for the design, consulting or plant engineer.

He *knows* that Winsmith can meet his specifications *precisely* with the world's most complete line within this category. And even more important, he *knows* that recommendations from Winsmith's engineering representatives can always be counted on to be practical and unbiased. That's only natural with so large a variety of standard units to choose from.

As one-of-a-kind replacements in the plant, or in quantities to serve as components on new machines, standard Winsmith Speed Reducers are a certain solution where ratings must be within the range of: 1/10 to 85 hp, 1.1: 1 to 50,000 : 1 ratio and 32 to 113,000 in. lbs. max. output torque.

Fully descriptive literature, which includes suggestions for simplifying and expediting selection, will be mailed at your request.

WINSMITH
SPEED REDUCERS

MEMBER OF AGMA

WINSMITH, Inc.
14 EATON ST.
Springville (Erie County) N. Y.

CALENDAR
OF MEETINGS

† Denotes first listing in this column.

October 1-2, American Machine Tool Distributors Association: Annual meeting, Chalfonte-Haddon Hall, Atlantic City, N. J. Association address: 1900 Arch St., Philadelphia. Executive secretary: Thomas A. Fernley Jr.

October 1-4, Association of Iron & Steel Engineers: Fall meeting, Sherman Hotel, Chicago. Association address: 1010 Empire Bldg., Pittsburgh. Managing director: T. V. Ess.

October 2-4, Society of Industrial Packaging & Materials Handling Engineers: Exposition and "short course," Hotel Cleveland, Cleveland. Society address: 20 W. Jackson Blvd., Chicago. Secretary: H. E. Brill.

October 3-5, Pressed Metal Institute: Fall meeting, Drake Hotel, Chicago. Institute address: 13210 Shaker Square, Cleveland 20. Managing director: Orrin B. Werntz.

†**October 5-7, Society of Industrial Designers:** Annual convention, Moraine Hotel, Highland Park, Ill. Society address: 48 E. 49th St., New York 17. Secretary: Robert H. Hose.

October 8-12, National Hardware Show: Grand Central Palace, Atlantic City, N. J. Managing director: Frank Yeager.

October 8-13, Concrete Reinforcing Steel Institute: Fall meeting, Grove Park Inn, Asheville, N. C. Institute address: 38 S. Dearborn St., Chicago 3. Managing director: H. C. Delzell.

October 9-12, The Electrochemical Society Inc.: Centennial—Fall convention, Hotel Statler, Detroit. Society address: 325 W. 102nd St., New York 25. Secretary: Henry B. Linford.

October 10-12, Porcelain Enamel Institute Inc.: Shop practices forum, Deshler-Wallick Hotel, Columbus, O. Institute address: 1010 Vermont Ave. NW, Washington. Secretary: Edward Mackaser.

October 11, American Iron & Steel Institute: Regional technical meeting, Hotel Warwick, Philadelphia. Institute address: 350 Fifth Ave., New York. President: Walter S. Tower.

†**October 11-12, Society for Advancement of Management:** Chicago Industrial Engineering Conference, Naval Armory, Chicago. Society address: 53 W. Jackson Blvd., Chicago 4. Chairman: Theodore W. Franks.

†**October 11-12, American Institute of Mining and Metallurgical Engineers & American Society of Mechanical Engineers:** Annual fuels conference, Roanoke Hotel, Roanoke, Va. Institute and Society address: 29 W. 39th St., New York 18. Institute secretary: Edward H. Robie; Society secretary: C. E. Davies.

October 12-14, Metal Treating Institute: Annual meeting, Detroit. Institute address: 271 North Ave., New Rochelle, N. Y. Executive secretary: C. E. Herington.

October 13-14, American Society for Metals: Annual seminar, Hotel Statler, Detroit. Society address: 7301 Euclid Ave., Cleveland. Secretary: W. H. Eisenman.

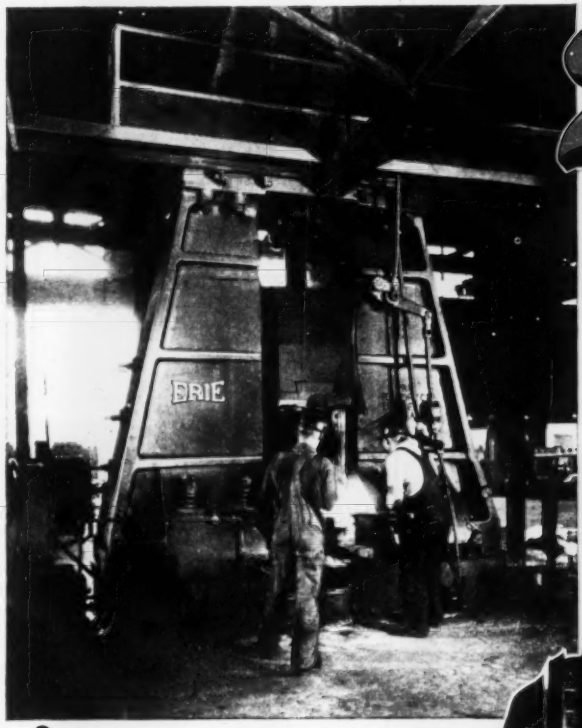
October 13-17, Packing Machinery Manufacturers Institute: Fall meeting, Mid Pines Club, Southern Pines, N. C. Institute address: 342 Madison Ave., New York 17. Secretary: Helen L. Stratton.

October 14-18, American Hardware Manufacturers Association: Fall meeting, Marlborough-Blenheim Hotel, Atlantic City, N. J. Association address: 342 Madison Ave., New York 17. Secretary: Arthur L. Faubel.

October 15-17, American Gas Association: Annual meeting, Kiel Auditorium, St. Louis. Association address: 420 Lexington Ave., New York 18. Secretary: Kurwin R. Boyes.

October 15-18, American Welding Society: Annual meeting, Book-Cadillac Hotel, Detroit. Society address: 33 W. 39th St., New York 18. Secretary: J. G. Magrath.

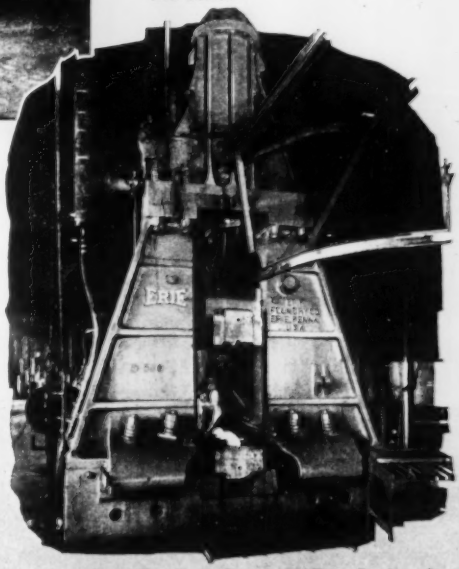
(Continued on p. 103)



21 ERIE STEAM HAMMERS HERE!

A large mid-western forge shop is making quality automotive forgings on 2 Erie Steam Hammers of 12,000 lb. rating, 10 Eries of 5,000 lb. rating and 9 Eries of 15,000 lb. rating. Why? Mainly because Erie Hammers are the choice of experienced Hammergangs and of the management men who pay the bills. Rugged Dependability is the answer—Erie Hammers produce profitably!

On Erie Hammers all stressed parts, frame, anvil, upper works are steel.



9 – 15,000 lb.

2 – 12,000 lb.

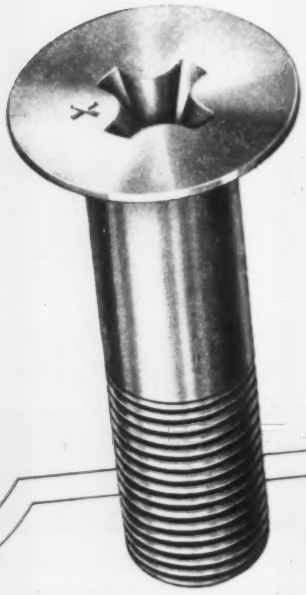
10 – 5,000 lb.

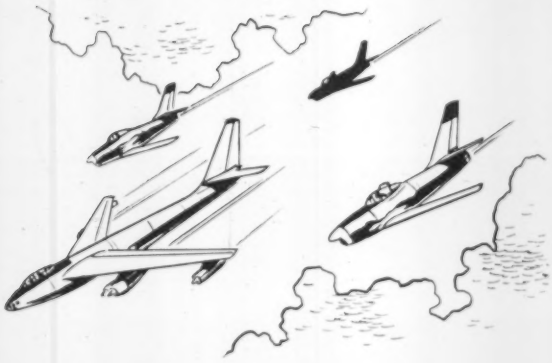
ERIE

Write for Bulletins Describing in Detail Erie Steam Drop, Board Drop, Single and Double Frame Forging Hammers, Pneumatic Hammers and Trimming Presses.

ERIE FOUNDRY COMPANY
Erie, Pa., U.S.A.

ERIE BUILDS *Dependable* HAMMERS





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PHILLIPS HEADquarters for the Aviation Industry

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The American Phillips Recess affords exceptional torquing strength, a feature which . . . added to precision manufacture and quality control . . . gives to all American products (like the screw shown above) accuracy of countersink angle, head thickness, and concentricity. This is American's contribution to uniform flushness in assembly.

. . . and "HI-SHEAR"* RIVET PINS

These rugged fasteners are made by American in alloy steels, to closest tolerances and highest standards of physical quality.

So on *any* of your fastening problems, it pays to "*ask American first*," for then you get the know-how of American engineers and research experts . . . plus the modern facilities of one of the industry's high-volume production plants.

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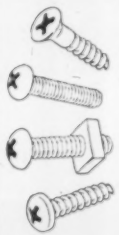

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WILLIMANTIC, CONNECTICUT

Main Office & Plant
Willimantic, Conn.

Office & Plant, Norristown, Pa.

Office & Warehouse, Chicago, Ill.

(Continued from p. 100)

October 15-18, Society for Non-Destructive Testing Inc.: Annual meeting, Hotel Detroiter, Detroit. Society address: Box 710, Evanston, Ill. President: W. E. Thomas.

October 15-19, American Society for Metals: National Metal Congress & Exposition, Statler Hotel, Detroit, and Michigan State Fairgrounds. Society address: 7301 Euclid Ave., Cleveland. Secretary: W. H. Eisenman.

October 15-19, The World Metallurgical Congress: Hotel Statler, Detroit. Sponsored by American Society for Metals. Manager: W. H. Eisenman; director: Dr. Zay Jeffries.

†October 15-19, National Association of Manufacturers: Annual institute on industrial relations, Lake Placid Club, Essex County, New York. Association address: 14 W. 49th St., New York 20. Institute director: Sibyl S. Patterson.

October 16-19, Scientific Apparatus Makers Association: Record controller & midyear meeting, Seaview Country Club, Absecon, N. J. Association address: 20 N. Wacker Drive, Chicago 6. President: Kenneth Anderson.

October 17-18, Steel Shipping Container Institute Inc.: Fall meeting, Pierre & Hampshire House, New York. Institute address: 570 Lexington Ave., New York 22. Secretary: L. B. Miller.

October 18-20, Anti-Friction Bearing Manufacturers Association: Fall meeting, The Homestead, Hot Springs, Va. Association address: 60 E. 42nd St., New York 17. Secretary-manager: H. O. Smith.

October 18-20, National Association of Corrosion Engineers: Annual meeting, south-central region, Corpus Christi, Tex. Association address: 919 Milam Bldg., Houston 2. Executive secretary: A. B. Campbell; meeting chairman: George A. Mills.

October 19-20, American Society of Tool Engineers: Semi-annual directors' meeting & south-central regional meeting, Vendome Hotel, Evansville, Ind. Society address: 10700 Puritan Ave., Detroit 21. Executive secretary: Harry E. Conrad.

October 22-24, American Mining Congress: 1951 metal and nonmetallic mineral mining convention, Biltmore Hotel, Los Angeles. Congress address: Ring Bldg., Washington 6. Secretary: Julian D. Conover.

October 22-24, American Standards Association: Annual meeting & national standardization conference, Waldorf-Astoria Hotel, New York. Association address: 70 E. 45th St., New York. Secretary: G. F. Hussey Jr., Adm., USN, Ret.

October 22-24, Packaging Institute: Fall meeting, Commodore Hotel, New York. Institute address: 342 Madison Ave., New York 17. Secretary: Laurence V. Burton.

October 22-25, American Institute of Steel Construction Inc.: Fall meeting, The Greenbrier, White Sulphur Springs, W. Va. Institute address: 101 Park Ave., New York 17. Executive vice president: L. Abbott Post.

October 22-25, The Wire Association: Annual convention, La Salle Hotel, Chicago. Association address: 300 Main St., Stamford, Conn. Executive secretary: Richard E. Brown.

October 22-26, American Association of Electrical Engineers: General fall meeting, Hotel Cleveland, Cleveland. Association address: 33 W. 39th St., New York 18. Secretary: H. H. Henline.

October 23-26, Gray Iron Founders Society Inc.: Fall meeting, Edgewater Beach Hotel, Chicago. Society address: 210 National City—E. 6th St. Bldg., Cleveland. Executive vice president: Donald H. Workman.

†October 26-27, American Institute of Mining and Metallurgical Engineers, National Open Hearth Steel Committee: Annual meeting, Southern Ohio section, Deshler Wallick Hotel, Columbus, O. Institute address: 29 W. 39th St., New York 18. Section chairman: V. W. Jones, Armco Steel Corp., Middletown, O.

October 28-30, Conveyor Equipment Manufacturers Association: Fall meeting, The Homestead, Hot Springs, Va. Association address: 1129 Vermont Ave., Washington 5. Executive vice president: R. C. Sollenberger.

October 29-31, American Gear Manufacturers Association: Semi-annual meeting, Edgewater Beach Hotel, Chicago. Association address: 302 Empire Bldg., Pittsburgh 22. Secretary: Newbold C. Goin.

October 29-31, National Lubricating Grease Institute: Fall meeting, Edgewater Beach Hotel, Chicago. Institute address: 4638 Nichols Parkway, Kansas City 2, Mo. Executive secretary: Harry F. Bennetts.

October 31-November 2, Foundry Equipment Manufacturers Association: Fall meeting, The Homestead, Hot Springs, Va. Association address: Engineers Bldg., Cleveland 14. Executive director: Arthur J. Tuscany.

October 31-November 2, Porcelain Enamel Institute Inc.: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Institute address: 1010 Vermont Ave. N.W., Washington 5. Secretary: Edward Mackaser.

October 31-November 2, Association of American Battery Manufacturers Inc.: Annual meeting, Palmer House, Chicago. Association address: 2706 Tower Bldg., Akron. Secretary: V. L. Smithers.

NOVEMBER

November 1-2, Industrial Management Society: Annual time-motion study and management clinic, Sheraton Hotel, Chicago. Society address: 35 E. Wacker Drive, Chicago 1.

November 1-4, National Tool & Die Manufacturers Association: Annual convention, Statler Hotel, St. Louis. Association address: 906 Public Square Bldg., Cleveland. Executive secretary: George S. Eaton.

†November 2-3, Eastern States Blast Furnace & Coke Oven Association: Joint fall meeting with Blast Furnace Association of Chicago District, Hotel Statler, Cleveland. Association address: 2300 Chester Ave., Cleveland 1. Secretary: Benjamin B. Frost.

When it comes to production- come to Hartford Special
Automatic Thread Roller
ROLLS 120 to 150 PCS. PER MIN.
Completely Automatic Feed
Filtered Lubrication
Table Top Working Level
Vibration Free Operation
Quick, Easy Set-ups
Class 3 Fits
diam. from .086" to .190"
thread lengths from ⅛" to 1½"
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IMMEDIATE DELIVERY
OF LIMITED NUMBER OF MACHINES
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THE HARTFORD SPECIAL MACHINERY CO.
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Manufactured and Sold by
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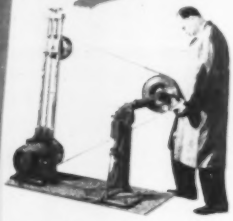
Clawson, Michigan

You can do almost anything in sanding on this tool — use it either vertically or horizontally, get into small contours (inside diameters, outside diameters), and close radius work. Finish inside surfaces and other spots and areas that have always been comparatively costly problems to handle on a volume basis. It might be just what your present production needs. Why not talk it over with a BEHR-MANNING Abrasives Engineer.

new — The BADER BELT POLISHER



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STEPHEN BADER & CO.
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This versatile machine enables use of a wide range of diameters in contact wheels — from 2" to 18" — permitting the finishing of convex or concave surfaces. The contact wheel is an idler, and as the drive wheel *pulls* the belt past the work, no chatter occurs in even heavy cuts. Wheels as well as belts can be changed in only seconds. Wheels may be of any material giving the desired flexibility and contour — cloth, soft rubber, felt, etc.

Your BEHR-MANNING Abrasives Engineer will give you full details.

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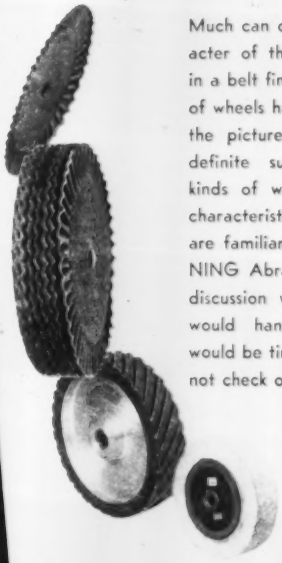
in BELT POLISHING!

New BELT STRAPPING UNIT

This inexpensive arrangement which can be built in your plant requires a flanged motor pulley, and an idler of the spring tension type, with a foot treadle to relieve belt tension and permit the operator to remove the belt from the idler pulley. Thread the belt through the hole to be polished, and replace the belt on the idler. Release the foot treadle. It is not necessary to stop the driving wheel as the belt slips on the flanged pulley when tension is eased. Here is certainly a fast way to finish those hard-to-get-at inside surfaces such as the eyes of shears. The BEHR-MANNING Abrasives Engineer has all needed data.

New RUBBER AND BUFF CONTACT WHEELS



Much can depend upon the character of the contact wheel used in a belt finishing job. New types of wheels have recently come into the picture, each demonstrating definite superiority on certain kinds of work. The details and characteristics of all these wheels are familiar to your BEHR-MANNING Abrasives Engineer, and a discussion with him as to which would handle your work best would be time well invested. Why not check on it?

Here's a Packet You Should Have

"Blueprints for Production" covers in detail much that is outlined on these two pages, as well as other new ideas and equipment. Your request brings it — Address Dept. S-18.

• TROY, N. Y. DIVISION OF NORTON COMPANY

STONES • PRESSURE-SENSITIVE TAPES

CANADA: BEHR-MANNING (CANADA) LTD., BRANTFORD, ONT.

Are you turning in all your SCRAP?

Don't wait for "George" to do it

You'll find your local scrap dealers listed in the yellow pages of the phone directory.

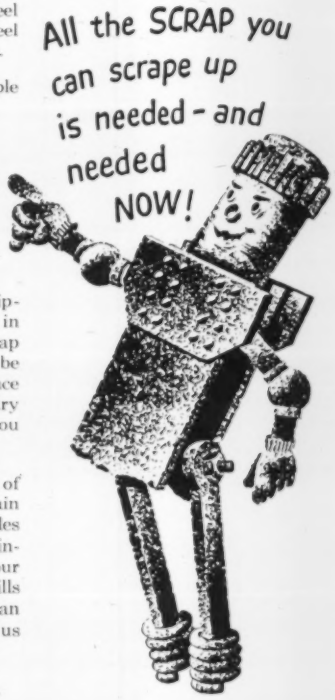
IF you are a steel user, this important job of getting more scrap back to the mills is directly up to *you*. You just cannot afford to sit idly by while the scrap shortage gets worse. For unless everyone really pitches into this job of digging out all the scrap possible, steel production is bound to suffer, and every steel user, in more or less degree, will suffer too.

More scrap means *more* steel—it's as simple as that.

Right now some mills have only a bare two-days' supply of scrap on hand. Others have even less. Some steel-making furnaces already have had to shut down for lack of scrap. The situation is serious. Only you can help improve it.

By turning in every piece of worn-out equipment, every obsolete tool and machine, in fact every pound of iron and steel scrap you can comb out of your plant, you'll be helping relieve the worst scrap shortage since Pearl Harbor days . . . and the steel industry will be able to produce more of the steel you need.

Remember—it takes at least one-half ton of scrap to make one ton of steel. To maintain steel's present high production schedules requires more than 1400 carloads of industrial scrap *every* day. So turn in your scrap—ALL your scrap—and keep the mills rolling. This is more than a shortage. It's an emergency that vitally concerns you—and us—and the Nation.



This page would ordinarily be used to tell you about

OUR STEEL WAREHOUSE SERVICE

but, because steel cannot be produced without SCRAP, we are asking instead for your all-out help in getting more SCRAP to the mills.

UNITED STATES STEEL SUPPLY COMPANY
WAREHOUSES COAST-TO-COAST

USS TRADE MARK

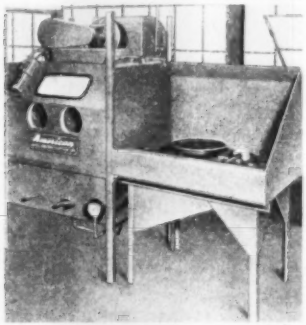
1-1348-A

UNITED STATES STEEL

New Products and Equipment

Wet Blaster Has Slurry Pump

A vertical pump for slurry recirculation is introduced in a wet blast furnace made by American Wheelabrator & Equipment Corp., Mishawaka, Ind. Because of its position, the pump eliminates suction piping,



valves and fittings. Pump is primed by flooded-type suction, making operation of valves unnecessary for starting or stopping. Absence of packing glands eliminates loss of slurry through leakage. Abrasives cannot plug the pump impellor when the machine is shut down and the hopper need not be drained before pump is removed.

Reset timer is available to tell number of blasting hours abrasive has been in the machine. When abrasive needs changing, an air ejector blows the slurry through a length of hose, either to a sump pit or to barrels. Wet blaster performs work for which dry blasting is too severe, i.e.—work with thin edges and sharp corners or work needing precision cleaning. Abrasive sizes stocked range from 80 to 2500 mesh.

Check No. 1 on Reply Card for more Details

Class H Insulated Transformers

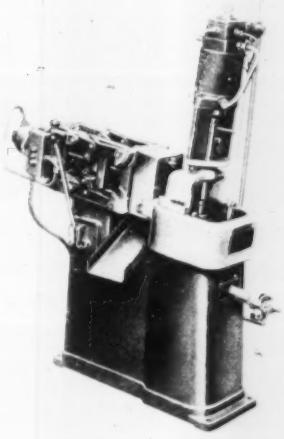
A line of dry-type transformers with class H insulation for station auxiliary, unit substation and network service is offered by Pennsylvania Transformer Co., Box 330, Canonsburg, Pa. These are available as ventilated or sealed-in-nitrogen units. Ventilated units are made in ratings up to 3000 kva and in voltages up to 15 kv.

Class H transformers are fire and explosion-resistant, moisture-repellant and heat-stable. Insulation consists of inorganic materials such as glass, porcelain and asbestos bonded or impregnated by silicone resins or rubbers, or by fluorocarbon resins. Exposed to air, class H insulation has about 100° C temperature advantage over class B insulation.

Check No. 2 on Reply Card for more Details

More Pressure, Larger Castings

Higher pressures exerted on molten metal from normal airline pressures of 80-100 pounds are a result of improvements made on model M55A die casting machine by DCMT Sales Corp., 164 Duane St., New York 13, N. Y. Called model IMP-96, this im-



proved machine offers a pilot-operated impact-type injection cylinder with slide valve in head, controlled by a trip lever and employing a safety interlock valve to prevent metal injection before dies are fully closed. Also incorporated is the double toggle air-operated die unit of larger capacity and locking load. Results can mean larger and heavier castings than were produced on previous models.

Improved model operates on standard 80 psi airline, consuming 0.55 cu ft of free air per cycle of operation. It exerts 1620 pounds pressure on metal with $1\frac{1}{2}$-inch diameter plunger. Size of die plates is 9 x 6 x $1\frac{1}{2}$ inches; pot capacity for zinc is 45 pounds; floor space is 30 x 12 inches, and net weight is 450 pounds.

Check No. 3 on Reply Card for more Details

Butyl Process Goes Outdoors

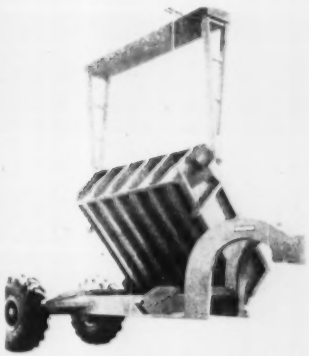
Butyl-molded current transformers, introduced previously for indoor use, are being offered in a line for both indoor and outdoor application by the meter and instrument department, General Electric Co., Schenectady 5, N. Y. Transformers can be used on single-phase and polyphase circuits. First of the line is type JKP-O, a 600-volt window-type unit with primary ratings of 200, 400 and 600 amperes, designed to carry 200 per cent of rated primary current continuously. When mounted on an adapter plate, it meets dimensional requirements of EEI specification MS2 for low voltage metering current transformers.

Core is of silicon strip steel, secured to the base by a metal band. After assembly of core and base, the secondary is wound with copper wire. Core and winding are preheated and placed in a mold, into which uncured butyl is forced. Molded insulation permits compact designs meeting standard mounting dimensions for indoor applications, and is completely waterproof for outdoor service.

Check No. 4 on Reply Card for more Details

Side Dump Has 15 Tons Capacity

Easton Car & Construction Co., Easton, Pa., is introducing its model TL-1015, a lift-door side-dump of 15 tons capacity, first in a line of semi-trailers of goose-neck construction



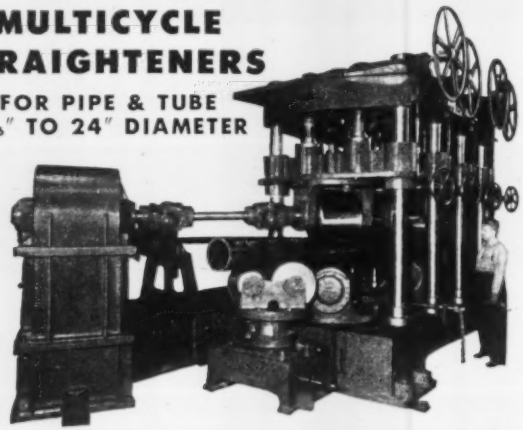
planned by the company. Lift door body is designed for fixed point dumping, using electric overhead dumping system. Pushbutton controlled overhead hoist operates a dual hook that engages the two dumping bars on the lift door. Door is raised clear of the load, then serves as a bail to raise the body to the complete discharge angle. Maximum dumping angle is 70 degrees.

Body and trailer frame are of all-welded steel construction, with heavy box-section reinforcements throughout. Body floor is reinforced by an oak floor cushion and a replaceable

Straighten Pipe & Tube
Up To 24" At High Speed

MEDART

MULTICYCLE
STRAIGHTENERS
FOR PIPE & TUBE
1/16" TO 24" DIAMETER



THERE IS A DIFFERENCE IN STRAIGHTENERS! Only the Medart Multicycle offers a double straightening cycle, imposed by two bending stations to insure end-to-end straightness.

GENTLER HANDLING OF PIPE WALL! For large thin wall pipe or tubing the Multicycle employs dual-type bending rolls to distribute the straightening load around the tube circumference and eliminate usual single point high pressure concentration.

UNBALANCED TWISTING TORQUE ELIMINATED! Both top and bottom feed rolls are driven on the Medart Multicycle for balanced torque about the neutral axis of the workpiece.

SINGLE DRIVING MOTOR! Only one driving motor is required, insuring positively synchronized roll speed, longer roll life.

NO RUBBING GUIDES! All guiding action is accomplished by rollers mounted in anti-friction bearings — no friction or shoe-type guides are required.

COMPARE THE MULTICYCLE ADVANTAGES! Also straightens solid rounds — motorized setup adjustment on larger models — all gears running in oil — Timken bearing equipped throughout — many other patented features.

Write for Catalog

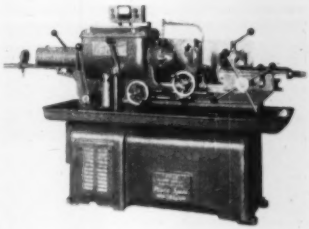
THE MEDART COMPANY 3535 DeKALB ST. ST. LOUIS 18, MO.

steel liner plate. To complete this line, the company will make lift door trailers available to 30 tons capacity. Other models will also incorporate 15 and 30-ton automatic drop doors, hydraulically dumped units for pit, mine and construction services.

Check No. 5 on Reply Card for more Details

Turret Lathe Cut to Essentials

Improvement of its No. 2 turret lathe to use standard assemblies and eliminate complex devices required only for rare operations is announced by Simmons Machine Tool Corp., Albany 1, N. Y. Lathe has 1¼-inch bar capacity; is designed for rapid production of precision parts and a



variety of bar and chucking operations. It features remote speed control, helical gears in the headstock, and an electrical tachometer that indicates spindle speed. Speed change, formerly selected by hand wheel, is done by pushbutton operation. The electric control permits a wide range of reversible speeds and incorporates overload protection.

Spindle is mounted so opposed antifriction bearings on the head end control longitudinal adjustment. The straight, precision roller bearing on the rear end allows for expansion without disturbing the spindle adjustment. Spindle drive is obtained through standard, separable-link V-belting. Power feed to the turret ram is provided through a three-speed gear box, and a worm wheel mounted on a turret saddle. A motor-driven coolant pump, with piping, is standard equipment.

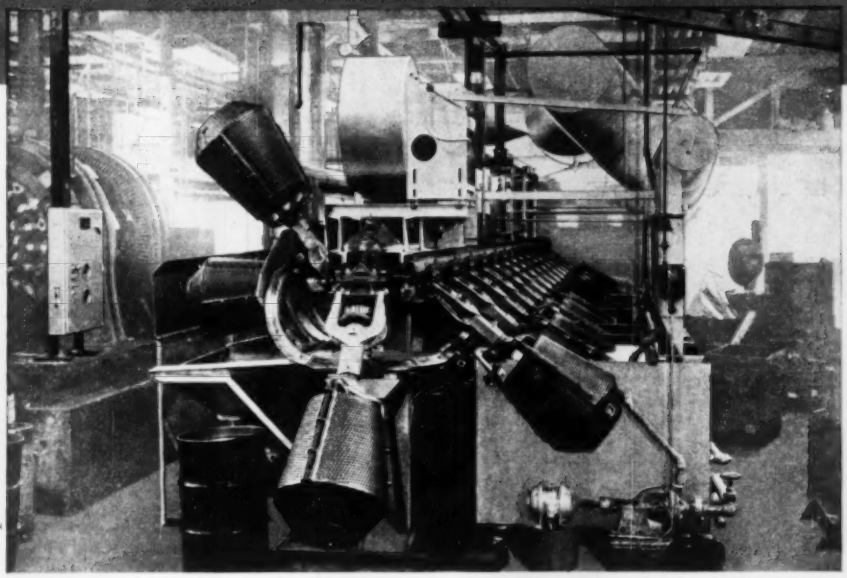
Check No. 6 on Reply Card for more Details

Conveyor Is Mass Feeder

Addition of a continuous conveyor feeder unit to its standard line of materials handling equipment is announced by May-Fran Engineering Inc., 1725 Clarkstone Rd., Cleveland 12, O. The feeder handles small forgings, castings, stampings and machined parts during heat treating, sandblasting, washing, cleaning and other processing operations in which mass feeding and handling is neces-

Presenting

THE NEW STEVENS SUPER "E" FULL AUTOMATIC BARREL PLATING MACHINE



Imagine one man processing 16,000 pounds in eight hours! That is what this new Stevens plating machine can do for you. Like the famous Stevens Model "C," the new Super "E" Model can be used for Cleaning, Pickling, Plating and Drying—and it will automatically unload the processed parts. All you do is load it manually or automatically.

Designed primarily for the plating and finishing of bulky metal parts in large volume, the Stevens Super "E" will bring important savings to your operations. Low cost per piece or pound is immediately evidenced. Both the Stevens Super "E" and smaller Model "C" are the only full automatic barrel plating machines on the market today.

If your production involves plating or finishing of bulky metal parts in volume, it will pay you to investigate this new Stevens Super "E" Model. Ask your Stevens representative for details or write to *Frederic B. Stevens, Inc., Detroit 16, Michigan.*

Be sure to visit the Frederic B. Stevens exhibit and see this machine in operation at the National Metal Exposition and Congress at Michigan State Fair Grounds in Detroit, October 15 through 19, Booths 330, 336 and 342 in Building "D."

METAL FINISHING EQUIPMENT AND SUPPLIES SINCE 1883

FREDERIC B. STEVENS INCORPORATED

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DETROIT 16, MICHIGAN

FREDERIC B. STEVENS OF CANADA, LTD.

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Enduro®

TAKES A "BITE" OUT OF HIGH MACHINING COSTS

● ENDURO Stainless Steel takes a shine to dentists.

In dental hand-pieces—precisely machined from ENDURO forgings—it retains its bright shining lustre despite day-after-day sterilizing. ENDURO instruments are sanitary; free from rust, corrosion and oxidation; tough and long-lasting.

ENDURO responds uniformly to forging—and, as these intricate parts indicate, is readily machinable.

In addition, ENDURO Cold Finished Bars—processed by Republic's Union Drawn Steel Division—provide close tolerances, accuracy of section, uniform soundness and fine surface finish. Two grades are approximately 90% as machinable as Bessemer screw stock. All these qualities combine to hold unit costs and reject losses for stainless steel parts to lowest possible levels.

Republic metallurgists and machining technicians are ready now to help you take large "bites" out of high machining costs through the proper application of ENDURO free-machining bars—both hot rolled and cold drawn. Write:

REPUBLIC STEEL CORPORATION

Alloy Steel Division • Massillon, Ohio

GENERAL OFFICES • CLEVELAND 1, OHIO

Export Department: Chrysler Building, New York 17, N. Y.

Republic ENDURO®

FREE-MACHINING

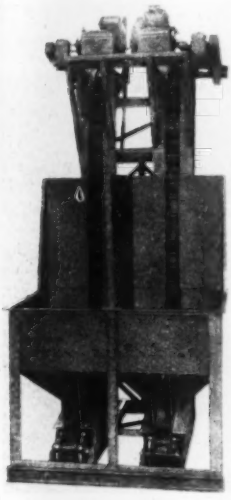
STAINLESS STEEL

REPUBLIC STEEL

Other Republic Products include Carbon and Alloy Steels—Pipe, Sheets, Strip, Plates, Bars, Wire, Pig Iron, Bolts and Nuts, Tubing

sary. Designed to recess 68 inches into the floor, the unit can be used also as a hopper storage bin prior to final discharge of parts for processing. Because the conveyor belt itself forms the bottom of the hopper, bridging is completely eliminated and a continuous uniform flow of parts is assured. Design of the flights prevents jamming of parts in turns of the hinged steel belt.

Feeder units are made having almost any belt width required. Height

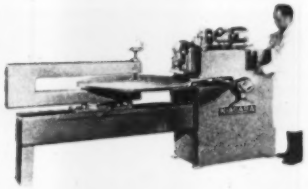


of individual unit is dependent upon intended application and size of hopper and can be varied to meet specific needs. An additional feature is a variable speed drive that regulates parts flow from one processing stage to another.

Check No. 7 on Reply Card for more Details

Circle Shear and Flanger

Alternate production of disks and heads is accomplished on a high-speed circle shear and flanger, of-



fered by Niagara Machine & Tool Works, 637 Northland Ave., Buffalo 11, N. Y. Conversion from one to the other operation is accomplished in 20 or 30 minutes, while setup can be changed quickly from one size job to another. It requires no blanking, forming or drawing dies for the many different size heads. As a circle shear, the machine cuts sheet up to 8 gage mild steel or 12 gage stainless. Disks 8 to 58 inches in diameter are produced from square blanks and disks as large as 75½ inches in diameter can be cut from octagonal blanks.

Converted to flanging, it turns high flanges up to 1½ inches deep from circular disks. Upper roll is moved down by power with speed adjustable to suit diameter and thickness of blank. Standard flanging rolls form a ⅜-inch radius at the root; head dimeters accommodate range from 18½ to 73½ inches.

Check No. 8 on Reply Card for more Details

Increasing Thread Capacity

A workholding and leading device for multiple-form cutter thread milling on lathes or milling machines is offered by Swisma Division, Gubelin International Corp., 35 W. 53rd St., New York 19, N. Y. Designed to make possible threads of greater ac-

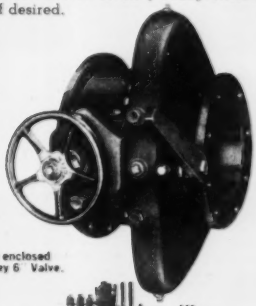
Dependable Operation under all conditions!

60" x 48" Bailey Valve for Horizontal Gas Main.

Bailey MECHANICAL GOGGLE VALVES

BAILEY Goggle Valves provide a tight, positive seal for shutting off gas mains in emergencies or for repairs. Requiring a minimum of maintenance, they operate by a powerful clamping force which is applied equally at all points around the disc periphery. Regardless of time between operations, they open or close instantly. Sizes from 6" to 72", totally enclosed if desired.

Instant Service Where It's Wanted, for—
GAS WASHERS
GAS MAINS
COKE PLANTS
BOILER PLANTS

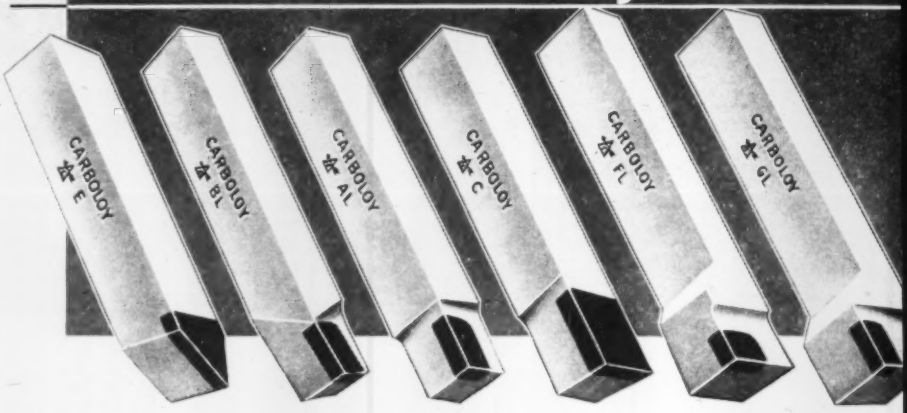


Totally enclosed type Bailey 6" Valve.

WILLIAM M. Bailey COMPANY
ENGINEERS
LEADERSHIP THROUGH QUALITY
1221 BANKSVILLE ROAD PITTSBURGH 16, PA.

Boost Production

with Standard Carboloy Tools..



with Carboloy Services... *finer*

An all-inclusive service program . . . to help you get the greatest possible benefit of performance and savings from Carboloy Cemented Carbides. Covers everything! Tool design . . . all phases of use, maintenance of carbide tools . . . practical tips on tool conservation, increased productivity.

Specific services and material include advice and assistance from skilled Carboloy engineers and technicians. A Customer Training School in Detroit for your key men (tuition-free). Slide Films (at approximate print cost) for your in-plant use. Technical Literature. Catalogs. Manuals. Charts. Everything you need to help select, design, fabricate, use and maintain carbide tools. New technical training literature for defense production, too.

Also, to increase the all-around efficiency of carbides in your plant, the Carboloy Plan of Coordinated Carbide Control . . . the famous "Triple C" Plan adopted and proved by hundreds of manufacturers.

Write, wire or phone Carboloy organization today for information about this outstanding Carboloy Service Program. Or contact your local Carboloy Sales Engineer or Authorized Distributor.

Specify CARBOLOY®

CEMENTED CARBIDE

Lower Costs...

ewer tools to do more jobs

No need to stock a heavy, costly inventory of special carbide tools... not when you use Standard Carboloy Tools. Only 11 styles are needed to do 4 out of 5 of your single-point tool machining applications. Whatever the job, whatever the material, chances are that one of these versatile Standard Carboloy Tools is adaptable.

Standard Carboloy Tools cost less than many high-speed steel tools, too, outlast them as much as 10 to 1. Wherever they're used, production goes up, tool costs go down. And savings in tool maintenance, down-time and tool replacement really add up.

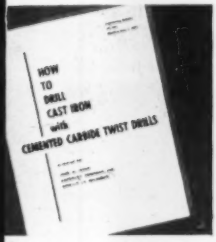
Over 14 million of these *uniform* high-quality Standard Carboloy Tools have been setting records throughout industry. Doing tough production jobs faster, better, cheaper.

Standard Carboloy Tools in the most commonly used sizes are available from your local authorized Carboloy distributor. The Carboloy organization is the world's oldest and largest producer of cemented carbides.

CARBOLOY
DEPARTMENT OF GENERAL ELECTRIC COMPANY
11141 E. 8 MILE AVE. • DETROIT 32, MICHIGAN

"Carboloy" is the trademark for the products of Carboloy Department of General Electric Company.

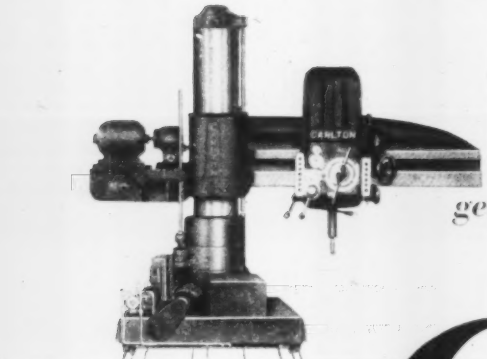
aids to extra performance



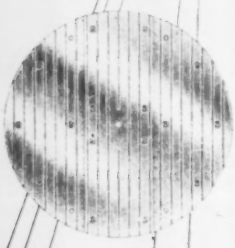
FOUR IN-PLANT CARBIDE AIDS. Part of the comprehensive Carboloy Service Program (left) to help you to new highs in production and savings through most effective use of cemented carbides. Program, illustrated above, left to right, includes: (1) Technical data on how to drill Cast Iron with Carbide Twist Drills, (2) Famous Carboloy "Triple C" Plan, (3) Cemented Carbide Data for Defense Production, for shell contractors only, and (4) Slide Films for training in carbides. All services free, with exception of slide films, which are yours at approximate print cost. Write today.

STANDARD TOOLS

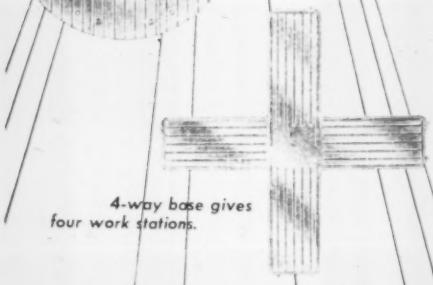
THE QUALITY BRAND



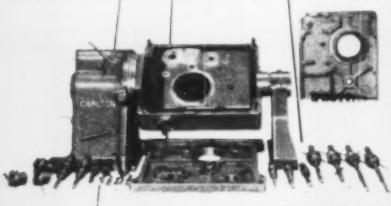
Track-type mounting for long, straight sweeps.



Full round base gives ample space for large work pieces.



4-way base gives four work stations.



Revolving jigs and fixtures give better drilling results faster.

get production flexibility and speed with

Carlton

radial drills, special bases and revolving jigs

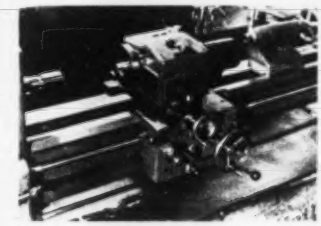
When you buy Carlton, you get the widest possible choice of radial drill capacity . . . for there are 4 different models with an almost unlimited number of column and arm sizes.

And special track-type mounting, seven different types of stationary bases, plain or uni-tilt tables, and revolving jigs . . . are available at slight additional cost . . . to help you increase your hole production.

For complete information, send today for descriptive bulletins.

THE CARLTON MACHINE TOOL CO., CINCINNATI 25, OHIO, U. S. A. THE CARLTON MACHINE TOOL CO.

curacy and better finish at high speeds, the attachment also is used to provide the lead for multi-rib wheel thread grinding on plain grinders. Short workpieces, to approximately 6 inches in diameter, are mounted in the three-jaw chuck provided with the attachment. Pieces up to 7 inches diameter or of irregular contour can be mounted on the face plate which also is provided. Long



work, up to 2½ inches diameter, will pass through the attachment spindle. Multiple threads are produced without difficulty provided lead is no coarser than six threads per inch.

Attachment is integrally powered by a 1/30-hp, two speed (750 and 1500 rpm) motor operating at reduction of 1081 to 1. Motor is reversible to provide for cutting left and right-hand or internal and external threads. Six spindle speeds are available by various combinations of motor speed and internal gearing, shifted by a lever.

Check No. 9 on Reply Card for more Details

Table Has Hydraulic Lift

A hydraulic clamping and raising device, built in and controlled by pushbutton panel at the operator's position, is featured in a rotating table developed by Ohio Machine Tool Co., Kenton, O. The table is

accurately graduated in ½ degrees and has a precision indexing unit, consisting of dial indicator and adjustable stops. Its standard specifications include a table size of 84 x 96 inches; overall height, 27 inches; tee slots, 1¼ inches; weight, approximately 37,500 pounds; and load capacity, 150,000 pounds. A hydraulic lift for raising the table top a few thousandths from its bearings is supported by an antifriction thrust bear-

Electro HIGH SPEED

48 POUNDS FASTER

Electro SINCE 1913

HIGH SPEED WHEELS FOR SNAGGING CUTTING-OFF TOOL ROOM AND CYLINDRICAL GRINDING for Swing Frame, Floor Stand, Bench Stand and Portable Grinding Machines

•

GRINDING WHEEL MANUAL 645 and Speed Calculator FREE ON REQUEST

Figure it as a 45% time saving or as a 48 pound production gain. Either way, it is a new high in grinding wheel efficiency and economy. • On grinding from 24" to 20" diameter on annealed malleable castings, Electro removed 6.8 lbs. of metal per cubic inch of wheel at 10.4 lbs. per hour. Electro removed 153 lbs. as against the average of 105 lbs. for competitive wheels. • May we show you with this or any other types of Electro wheels that comparable gains are immediately possible for you? A demonstration will place you under no obligation whatever. Write, wire or phone.

Electro Refractories & Abrasives Corporation

344 DELAWARE AVE.
BUFFALO 2, N. Y.

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Electro

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ing, making revolving possible with maximum load. Power rapid traverse in either direction through a built in high torque motor with magnetic brake is provided with contact pushbutton control. Machine has nonmetalic bearing surfaces between table top and base.

Check No. 10 on Reply Card for more Details

Filter Cleans Compressed Air

Model B Condensifilter, a device that removes water, oil and sludge from compressed air, is a development of Hankison Corp., 395 Renton Bldg., 1501 Beaver Ave., Pittsburgh 33. Its design combines in one unit a dehydrating device, mechanical filter and self-purging trap. It measures 15 inches high by 9 inches in diameter, and has a capacity of 30 cfm at 100 psi. The model is recommended for purifying and dehydrating compressed air used in combustion and process control.

In operation, air is admitted through the side, directed through the condensing section where it is dehydrated and passed through the filter. Total drop in pressure is less than 2 psi at 100 psi working pressure. Condensing unit is composed of a series of copper coils through which cold water flows. Filter is made of five hexagonal filter chambers in parallel, each chamber wrapped with seven layers of canton flannel. It provides more than 4 square feet of filtering area and removes pieces as small as 1.0 to 2.0 microns. Removal of $1\frac{1}{2}$-inch SAE nut dismantles entire filter for cleaning and service.

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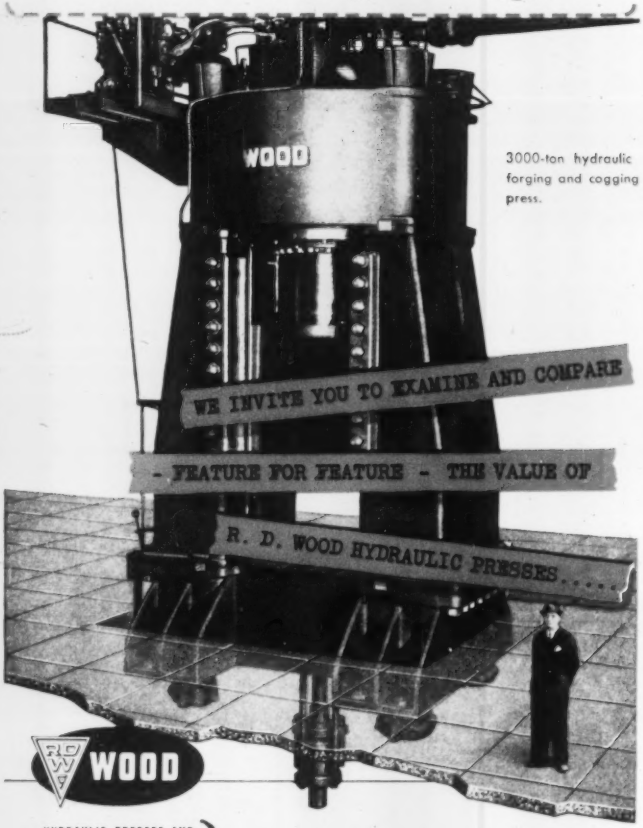

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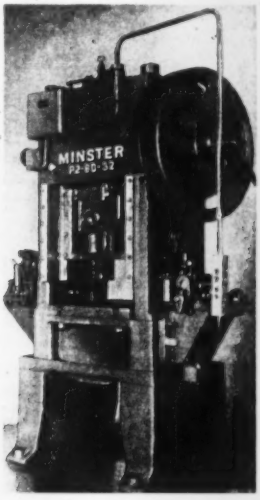
Automatic Production Press

Minster Machine Co., Minster, O., is offering its automatic production press, the Piece-Maker. The press features: Flywheel type combination air operated friction clutch and brake; pendent pedestal or press mounted



clutch control; four extra long gibs with eight guiding surfaces controlling slide in two directions; adjustable bronze ways on each corner of slide; long sleeve type manually-operated slide adjustment; and four-piece tie rod construction.

Series is available in capacities of 20, 30, 45, 60, 75, 100 and 150 tons. Speeds range from 200 to 400 strokes per minute on the 20-ton unit, to 75 to 150 on the 150-ton unit. Press has a double throw, full eccentric shaft and is offered in the flywheel type. All presses in the series are offered with variable speed drives.

Check No. 12 on Reply Card for more Details

Power Units Rated at 40 kv

Maximum voltage output is rated at 40 kv on models 402 and 402R, added to the line of high voltage dc RF-type power units made by Inductograph

Products Inc., 236 W. 55th St., New York 19, N. Y. This maximum voltage makes 350 microamperes of current available; at 30 kv, 1¼ million milliamperes of current are available. Model 402 is continuously variable from 10 to 40 kv from front panel control. Model 402R incorporates voltage stabilization with front panel control varying output from 15 to 40 kv.

Check No. 13 on Reply Card for more Details

Lightweight Air Hammer

Model G-200 air hammer, made by Salsbury Corp., Los Angeles 1, Calif., is a lightweight hand tool. Working at 120 psi it strikes up to 6000 blows per minute with maximum force, or may be metered to any lower speed or striking power by a finger trigger action. Safety feature is a three-point ball bearing chuck that locks tools in working position and eliminates hazard of tool ejection.

Check No. 14 on Reply Card for more Details

Noncorrosive Flux

Mild acidity of No. 30 flux developed by Superior Flux & Mfg. Co., Cleveland 13, O., is neutralized by the heat of the soldering operation, leaving a residue that is normally noncorrosive, nonhygroscopic, nonconductive to electricity and nonfuming. It is recommended for soft solder applications where rosin base fluxes are unsatisfactory and where zinc chloride or other strong acid fluxes cannot be used because of corrosion factor.

Check No. 15 on Reply Card for more Details

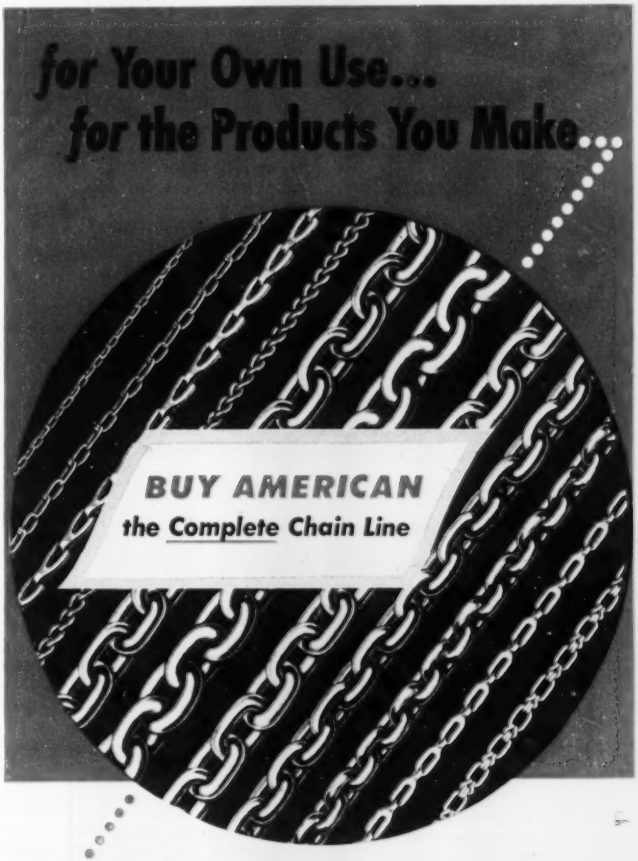
Indexable Blade Face Cutter

Detroit Milling Cutter Co., Farmington, Mich., announces a new type of solid carbide indexable blade face milling cutter for milling cast armor plate and other difficult steel machining jobs. It retains the Futurmil principle of multiple production runs without cutter grinding. When dull, solid carbide blades are indexed to a new cutting edge and the clearance angles are taken care of by position of the blade in the cutter body. Blade is square and is available in three optional sizes ranging from 1 to ¾-inch.

Check No. 16 on Reply Card for more Details

Simplifies Roller Chain Repair

Disassembling, repairing or connecting roller chain is simplified by the use of the new Baldwin-Rex chain vise available from Baldwin Duckworth Division, Chain Belt Co., Springfield, Mass. It makes it possible



11 popular AMERICAN chains are illustrated. There are many more . . . welded . . . weldless . . . and attachments. Sizes and types . . . from tiny jack chains . . . to huge stud link anchor chains.

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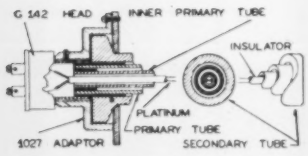
The porcelain insulation and protecting tubes which go into a complete thermocouple assembly are of the finest quality obtainable. They are the best known means of preventing contamination of the elements which result in false e.m.f. values. Also, the Gordon G-142 head which goes



into a complete thermocouple assembly is light in weight and permits easy replacement of new elements into a protecting tube assembly.

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to take apart single or multiple strand roller chain. Vise is made in two sizes: No. 1 for single strand roller chains from ½ through 1-inch pitch, for double pitch chains of 1, 1¼ and 1½-inch pitch and for double strand chains of ½, ⅝ and ¾-inch pitch. No. 2 is for single strand chains of 1 through 2-inch pitch and for double strand chains from 1 to 2-inch pitch.

Check No. 17 on Reply Card for more Details

Drill Holes at Any Angle

Multi-Angle drill unit, announced by Commander Mfg. Co., Chicago 24, Ill., is designed to provide freedom of setup to simplify drilling holes at any angle. Powered by a heavy duty flexible shaft with hydraulic actuation of full 4-inch stroke, it is a compact drill head that can be mounted on jigs and fixtures or built into special machines.

Check No. 18 on Reply Card for more Details

Washes Away Grease

A self-emulsifying solvent for washing away grease is introduced by Curran Corp., Lawrence, Mass. It can be used for cleaning carburetors, fuel pumps, diesel injectors, pistons, oil coolers, cylinder heads, pneumatic tools and metal parts. It is sprayed or brushed on and then hosed off.

Check No. 19 on Reply Card for more Details

Demineralizing Unit

Penfield Mfg. Co., Meriden, Conn., announces a Mono-Bed demineralizing unit. Cation and strong base anion exchangers are mixed in a single unit tank to provide in one container the equivalent of a large number of multiple bed systems. Raw water passes through the Mono-Bed column once and comes out with a mineral content of virtually zero.

Check No. 20 on Reply Card for more Details

Precut Masks and Gaskets

Known as Quik-Masks, self-adhesive, precut masks and gaskets made by W. H. Brady Co., Chippewa Falls, Wis., are applied without moistening to the areas requiring protection. They provide protection during spray painting, cleaning, plating, machining, tumbling, sandblasting and other production operations.

Check No. 21 on Reply Card for more Details

Peg Rack Truck Protects Parts

Armatures, rotors, gears and other parts can be moved from one operation to another in production on the new peg rack truck built by Lloyd Engineering Co., Belleville 9, N. J. In transit, parts are hung on cushioning racks inclined at 15 degree angle and separated from each other as protection against damage by banging together.

Check No. 22 on Reply Card for more Details

Power Hack Saw Blade

Powerflex, a high speed power hack saw blade, offered by G. W. Griffin Co., Franklin, N. H., is made with three separate pieces that are welded together. Back is tough steel for shock absorption, middle is medium hard steel for more power and straighter cutting, cutting edge is hard and tough for lasting sharpness.

Check No. 23 on Reply Card for more Details

Floor Patching Compound

Permanent repairs to chuck holes or breaks in concrete floors can be made quickly by using Por-Rok quick setting cement, manufactured by Hallemite Mfg. Co., Cleveland 13, O. Compound is mixed with water and poured into the cleaned out hole or break. It is self-bonding, will not shrink and requires no troweling. Patch is ready for light loads in 15 minutes.

Check No. 24 on Reply Card for more Details

Carbide Tipped Masonry Drill

Speed Spiral, a new carbide tipped masonry drill is available from Super Tool Co., Detroit 13, Mich. It is machined from the solid with a round nose supporting the carbide tip. Design provides ample dust clearance.

Check No. 25 on Reply Card for more Details

Wire Harness Clamp

Security for bundles of wire in aircraft, heavy vehicles or mobile units is assured by a wire harness clamp available from Tinnerman Products Inc., Cleveland, O. It can be opened and closed without the use of tools and is built with an interlocking slot and tongue so it cannot be opened accidentally. It is made to be used singly or in tandem and to hold bundles 5/16 to 1¼-inch in diameter.

Check No. 26 on Reply Card for more Details

FOR MORE INFORMATION

on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Helpful Literature

73. Furnace Arches

Laclede Arch Co.—Details of the Laclede tile suspended arch are presented in 4-page illustrated bulletin. Special attention is given to tile suspension construction as applied to open hearth furnaces.

74. Mobile Crane

R. G. LeTourneau Inc.—Having capacity of 15 tons, maximum lift of 35 ft and maximum reach of 35 ft, model EC-15 Tournacrane is designed for use with model C Roadster Tournapull. Full details regarding this large mobile crane unit are given in 4-page illustrated bulletin C-647.

75. Large Vertical Motors

Allis-Chalmers Mfg. Co.—Usable for pump drives and similar applications, vertical shaft induction motors in sizes upwards from 60 hp at 200 rpm are described in 4-page illustrated bulletin 05B7629. Data are included on ratings, construction and available types.

76. Electrical Insulation

Richardson Co.—Illustrated catalog data sheet No. 20.725.6 relates story of application of Insurok electrical sheet insulation to television receiver components. Laminated material is offered in three electrical grades.

77. Aluminum Welding

Oakite Products, Inc.—Efficient methods of chemically preparing aluminum for spot welding are provided in illustrated 18-page booklet. Sections are devoted to cleaning, deoxidizing, rinsing and drying procedures and equipment to use.

78. Ball Bearing Application

General Motors Corp., New Departure Div.—Covering the most important fundamentals of application of ball bearings is Part I of "New Departure Engineering Service" devoted to types, uses and mounting. The 24-page bulletin includes those bearings which have become standard for general use.

79. Grab Buckets

McKiernan-Terry Corp.—Lightweight and standard type R Mead-Morrison grab buckets in nominal sizes from 1½ to 4 ton capacities are shown in 6-page illustrated folder R-1. Buckets are designed for handling coal, bauxite, fertilizer and other bulk materials.

80. Ammonia Dissociators

Sargeant & Wilbur, Inc.—Built to provide over 99.95 per cent efficient dissociation, horizontal cracking chamber-equipped ammonia dissociators are described and illustrated in 4-page folder. Dissociated ammonia is dry, reducing oxygen-free gas mixture containing 75 per cent hydrogen and 25 per cent nitrogen by volume.

81. Cupola Charging

Whiting Corp.—6-page bulletin FO-2 "Tips on Improving Cupola Charging" contains information on obtaining smoother flow of materials from freight car to cupola. It tells how mechanical charging can improve and conserve manpower.

82. Steam Trap Selector

Yarnall-Waring Co.—Steam trap selection tables are given for each of various types of common process and industrial equipment in 20-page catalog T-1750. Complete trap data and specifications for steam process, industrial space heating, steam generation and distribution and other types of equipment are given.

83. Castings

Hamilton Foundry & Machine Co.—48-page illustrated book "Hamilton Quality Castings" shows hundreds of examples of standard and special castings produced of gray iron, alloyed iron or Meehanite. Also covered are equipment and facilities of this company, as well as guidance in selection and use of iron castings.

84. Grinding Wheels

Cleveland Quarries Co., Sterling Grinding Wheel Div.—"The Art and Science of Grinding" is illustrated pocket-size manual presenting answers to 36 questions about grinding wheels. Included features are a historical report on the Sterling division, facts about various type wheels and grain, testing, operating speed and hood and flange data.

85. Humidity Control

Minneapolis-Honeywell Regulator Co., Brown Instruments Div.—4-page illustrated Instrumentation data sheet 10.5-4 describes new concept of humidity measurement that makes possible direct humidity readings from remote locations. Equipment for controlling humidities for industrial air conditioning is covered.

86. Universal Testing Machine

Steel City Testing Machines Inc.—4-page illustrated folder provides detailed specifications and general information on model MP-10 universal testing machines for making tensile, compression and transverse tests.

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87. Stamping-Forming Facilities

Greist Mfg. Co.—Facilities available for precision stamping, forming and intricate assembly work are described in 12-page illustrated brochure. This plant has 92,000 sq ft of manufacturing space on one floor; complete design, development and engineering departments; and machines to handle both prime and subcontracts.

88. Saw Blade Grinders

Peerless Machine Co.—8-page bulletin 60A describes and illustrates Tru-Tooth grinders for blades of metal-cutting power hack and band saws. Machines sharpen blade teeth and at same time deepen gullet to compensate for metal removed at cutting edge, thus restoring chip-clearing efficiency.

89. Brass Nuts

Fischer Special Mfg. Co.—Styles, specifications and part numbers of line of brass, odd size, battery and lighting fixture nuts as well as spark plug terminals are detailed in 15-page booklet "Fischer File of Fischer Turned Brass Nuts." Dimensional drawings on all styles are shown.

90. Cutting Oils

Fiske Brothers Refining Co.—Recommended procedures for use of C.S.A.2 cutting oils on aluminum and aluminum alloys are outlined in 1-page data sheet.

91. Roll Formed or Extruded?

R. D. Werner Co.—Decision as to whether light metal shapes should be cold roll formed or extruded is aided by 4-page folder "2 Ways To Figure Costs on Metal Shapes." With facilities for both, company can give unbiased answer.

92. Surface Flatness Gage

F. T. Griswold Mfg. Co.—How a beam of light is used as a straight-line reference in locating and measuring variations in surface flatness is explained in 4-page illustrated bulletin 20. Details are given on the Huet optical straightedge.

93. Small Precision Tools

R. Y. Ferner Co.—Illustrated price list "Precision Small Tools" contains 14 sheets of prices, dimensions and data on precision drills, machine screw counterbores, reamers and end mills which are used by instrument builders and machinery makers.

94. Roll Grinders

Farrel-Birmingham Co. — Performance, design and construction data on heavy duty roll grinder and attachments for precision production in heavy roughing or fine finishing is compiled in 27-page illustrated bulletin No. 115. Specification, dimension and weight tables and full list of company products are featured.

95. Atmospheric Generators

Hevi Duty Electric Co.—Heavy duty Atmo-Gen atmosphere generators used to provide atmospheres for clean nondecarburized hardening, dry cyaniding or carbonitriding, copper and silver brazing, carburizing, nitriding and sintering and bright annealing are detailed in data sheet IND-1147-CR.

96. Meter-Relays & Pyrometers

Assembly Products, Inc.—Simplytrol automatic contact meter-relay controls, pyrometers and accessory equipment are pictured and described in 4-page bulletin G-51. Listed applications include furnace temperature control, machine and conveyor feeds and speeds, radiation warning devices, crystal inspection and communications equipment control.

97. Pipe Threader & Cutter

Landis Machine Co.—8-page illustrated bulletin C-82-5 is descriptive of Little Landis pipe threading and cutting machine which handles from ⅛ to 3-in. diameter pipe and ⅛ to 1¼-in. or ⅜ to 1½-in. bolts. This three speed machine is driven by 1-hp motor.

98. Magnetic Separators

Dings Magnetic Separator Co.—12-page catalog C-5000-B describes and illustrates magnetic separators and lifting magnets used to remove iron from wet or dry materials carried on conveyors, in chutes and ducts. Units for magnetic concentration and purification and heavy media recovery are covered.

99. Strain Gages

Baldwin-Lima-Hamilton Corp.—Four ways SR-4 weighing units used for industrial weighing are described in 4-page bulletin "The SR-4 in Industry." Units are used in crane hooks, multitank weighing and batch liquid control, continuous weight integration for belt-carried materials and truck axle-scales.

100. Antirust Wrapping

Nox-Rust Chemical Corp.—18-page illustrated pamphlet "Nox-Rust Vapor Wrapper 'How' Book" presents data on corrosion-preventive wrapping for metal parts and machinery. Applications of various companies are shown and grade and protection data are tabulated. Rules for obtaining best wrapping results are listed.

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18	38	58	78	98
19	39	59	79	99
20	40	60	80	100

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STEEL INDUSTRY STATISTICS

STEEL
A PENTON PUBLICATION

October 1, 1951

Want to know how much steel some company can produce? Look here for the answer. This is the first report in three years on the iron and steel producers' capacities

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WHERE's the steel going to come from? That's the question on the lips of many metalworking executives and government officials concerned with building the country's defenses.

If you want to know, refer to the new issue of the "Directory of the Iron and Steelworks of the United States and Canada" being brought out by the American Iron & Steel Institute.

Whether you want to know who produces open-hearth steel in Pittsburgh or Rhode Island or how much capacity each producer in the country has for hot-rolled bars you can find those answers, plus answers to hundreds of other questions in this 1951 issue, the first one published since 1948.

The directory shows in detail as of Jan. 1, 1951, the facilities of each iron and steel company, as well as the tonnage and variety of products produced.

As a service to the metalproducing and metalworking industries, STEEL presents in this 16-page section the summary tables from the new directory, with permission of the institute. Included in this section is a table showing the home office address of each company listed in the statistical summaries.

Appearance this year of the new directory is particularly timely in view of the great expansion that in the last two years has pushed the iron and steel industry's production capacities to all-time high marks. The new directory is the first to list more than 100 millions tons of steel capacity.

The direction the capacities have taken in the last three years also is revealed in the new issue of the directory. For instance, the effect of unprecedented demand over that period for consumer goods, such as automobiles, refrigerators and washing machines, is reflected in big increases in capacities for turning out the light flat-rolled products. From 1948 to 1951, hot-rolled sheet and strip capacity rose almost 30 per cent and cold-rolled sheet and strip capacity climbed 25 per cent.

Evidences that the national defense program was beginning to have an effect on the country's steel producing and finishing capacities also appear in the new directory. Capacity for heavy structural shapes, needed for plant expansions, and capacity for plate, needed for railroad freight cars and other heavy applications, increased 11.8 per cent and 5 per cent, respectively.

The directory also shows that in the last three years hot-rolling capacity of the industry increased 13 per cent, slightly above the 11 per cent increase in steel-producing capacity.

Even the present record capacities of the U. S. iron and steel industry, the world's largest, are due to be eclipsed soon through continuation of the industry's large-scale expansion program. From 1946 to 1950, inclusive, steel companies spent $2.4 billion for new and improved facilities. In 1951 and 1952, more than $2.5 billion are expected to be spent. This will help carry the annual U. S. capacity for producing steel for ingots and castings to 118 million net tons for 1953.

Pig Iron

Growing to support an expanding steel industry, the country's blast furnace capacity hits alltime peak

BLAST FURNACES in the United States had a greater capacity on Jan. 1, 1951, than ever before for producing pig iron and ferroalloys. Marking the fourth consecutive year of increases, this date saw a capacity of 72,553,460 net tons. And more capacity is under construction. By the end of 1952 it will be 79,300,000 net tons.

The Jan. 1, 1951, capacity of 72,553,460 tons consisted of 71,455,060 tons for pig iron and 1,098,400 tons for ferroalloys. While this represented a continued increase in pig iron capacity it marked a slight decline in ferroalloy capacity. The latter was at an alltime high of 1,108,300 net net tons on Jan. 1, 1950.

The alltime record capacity of the country's blast furnaces today is not the result solely of the increase in the number of furnaces. True it is that the number has been on the increase for four years. Biggest factor, over the long period, in setting the capacity record is the increase in the size and capacity of the individual furnaces.

A quarter of a century ago—1926—this country had 395 blast furnaces, with a total capacity of 57,288,437 net tons. That meant there was an average annual capacity of 145,034 tons per furnace.

On Jan. 1, 1951, the 72,553,460 tons of capacity was provided by 250 furnaces. Thus, there was an average annual capacity of 290,214 tons per furnace, or a 100 per cent increase over the 1926 figure.

Indicating that the increase in size and capacity of furnaces is continuing, the 1951 average of 290,214 tons is an increase over the 289,464 tons of only a year previous.

The capacity increase stems from increase in size of new furnaces, rebuilding of old furnaces to boost their size, improvement of furnace design, improvement in blowing equipment that has permitted higher rates of blowing and high top-pressures, and various other improvements in blast furnace practice.

The rise in blast furnace capacity was necessitated by the big increase being made in steelmaking capacity, and figures show a constancy has been maintained in the ratio of one to the other. On Jan. 1, 1948, the nation's open-hearth and bessemer steel capacities totaled 88,836,690 net tons, while blast furnace capacity was 67,438,930 tons. This was a ratio of 0.76 ton of pig iron and ferroalloys to each ton of steel. On Jan. 1, 1951, the open-hearth and bessemer steel capacities had soared to 96,931,850 tons, and blast furnace capacity had climbed to 72,553,460 tons. This gave a ratio of 0.75 tons of pig iron and ferroalloys to each ton of steel.

From Jan. 1, 1948, when the institute last issued its directory showing in detail the capacities of the iron and steel industry, to Jan. 1, 1951, the number of stacks for producing pig iron increased by 13 and the number for ferroalloys declined by 2. Thus on Jan. 1, 1951, there were 236 stacks for pig iron and 14 for ferroalloys.

Blast Furnace Capacity by Companies

	PIG IRON		FERROALLOYS		Total annual capacity (N. T.)
	No. of stacks	Annual capacity (N. T.)	No. of stacks	Annual capacity (N. T.)	
Companies					
Alan Wood Steel Company	2	454,800			454,800
Allegheny Ludlum Steel Corporation	1	96,000			96,000
Armco Steel Corporation	3	1,341,000			1,341,000
Sheffield Steel Corporation	1	274,000			274,000
Valencia Iron & Chem. Corp.	1	27,000			27,000
TOTAL	7	1,642,000			1,642,000
Barium Steel Corporation					
Chester Blast Furnace, Inc.	1	200,000			200,000
Bethlehem Steel Company	29	10,170,000	2	180,000	10,350,000
Brooke Iron Company (E. & G.)	1	151,200			151,200
Colorado Fuel and Iron Corporation	6	1,308,000			1,308,000
Crucible Steel Company of America	2	532,000			532,000
Detroit Steel Corporation	1	259,200			259,200
Eastern Gas and Fuel Associates	1	200,000			200,000
Ford Motor Company	3	959,600			959,600
Globe Iron Company			1	90,000	90,000
Granite City Steel Co.	2	449,680			449,680
Inland Steel Company	8	2,638,950			2,638,950
Interlake Iron Corporation	6	1,244,860			1,244,860
International Harvester Company	3	719,710			719,710
Jackson Iron & Steel Company			1	93,000	93,000
Jones & Laughlin Steel Corporation	15	4,212,000			4,212,000
Kaiser Steel Corporation	2	876,000			876,000
Kaiser & Frazer Parts Corporation	1	300,000			300,000
Lavino & Company, E. J.			2	102,200	102,200
Lone Star Steel Company	1	366,600			366,600
National Steel Corporation					
Great Lakes Steel Corporation	3	1,100,000			1,100,000
Hanna Furnace Corporation	5	660,000	1	120,000	780,000
Wierton Steel Company	3	1,240,000			1,240,000
TOTAL	9	3,000,000	1	120,000	3,120,000
New Jersey Zinc Company			2	112,000	112,000
Newport Steel Corporation	1	144,000			144,000
Pittsburgh Coke & Chemical Company	2	474,100			474,100
Pittsburgh Steel Company	3	954,000			954,000
Republic Steel Corporation	21	6,592,000			6,592,000
Sharon Steel Corporation	3	709,620			709,620
Shenango Furnace Company	2	417,300			417,300
Sloss Sheffield Steel & Iron Company	3	386,470	1	36,800	423,270
Tennessee Products & Chemical Corp.	3	142,510			142,510
Tonawanda Iron Division	1	171,000			171,000
United States Steel Corporation					
American Steel & Wire Company	6	1,429,400			1,429,400
Geneva Steel Company	4	1,399,200			1,399,200
National Tube Company	9	3,098,700			3,098,700
Tennessee Coal, Iron & Railroad Co.	9	2,468,500	(a)	29,000	2,497,500
United States Steel Company	49	17,420,400	4	335,400	17,755,800
TOTAL	77	25,816,200	4	364,400	26,180,600
Wheeling Steel Corporation	6	1,678,500			1,678,500
Woodward Iron Company	3	592,760			592,760
Youngstown Sheet & Tube Company	12	3,616,000			3,616,000
GRAND TOTAL	236	71,455,060	14	1,098,400	72,553,460

TREND IN BLAST FURNACE CAPACITY—(Net Tons)

As of Jan. 1	Coke Pig Iron	Charcoal Pig Iron	Ferroalloys	Total
1951	71,455,060*	.....	1,098,400	72,553,460
1950	70,348,920	40,320	1,108,300	71,497,540
1949	69,435,130	40,320	1,066,400	70,541,850
1948	66,301,610	40,320	1,097,000	67,438,930
1947	64,674,020	32,480	1,002,700	65,709,200
1946	66,311,410	32,480	996,700	67,340,590
1945	66,256,850	64,480	992,600	67,313,890
1944	66,344,780	56,190	990,300	67,391,270
1943	62,859,330	107,200	967,000	63,933,530
1942	59,211,850	106,560	1,075,570	60,393,980
1941	56,522,370	106,560	980,660	57,609,590
1940	54,635,740	95,580	992,320	55,723,640
1939	55,162,374	103,040	1,060,416	56,325,830
1938	55,618,752	103,040	1,060,416	56,782,208
1937	54,418,480	103,040	1,035,776	55,557,305
1936	54,803,720	103,040	947,520	55,854,280
1935	55,999,710	150,640	947,520	57,097,870
1934	56,209,620	150,640	883,008	57,243,268
1933	55,452,964	159,040	898,688	56,510,692

*All pig iron figures are lumped together

BLAST FURNACE CAPACITY BY PLANT LOCATION AND OPERATING COMPANY

	PIG IRON		FERROALLOYS		Total annual capacity (N. T.)
	No. of stacks	Annual capacity (N. T.)	No. of stacks	Annual capacity (N. T.)	
Alabama					
Birmingham					
Republic Steel Corporation	2	456,000	...	...	456,000
Sloss-Sheffield Steel & Iron Company	2	281,230	...	...	281,230
Ensley					
Tennessee Coal, Iron & Railroad Co.	6	1,452,800	(a)	29,000	1,481,800
Fairfield					
Tennessee Coal, Iron & Railroad Co.	3	1,015,700	...	...	1,015,700
Gadsden					
Republic Steel Corporation	2	471,000	...	...	471,000
North Birmingham					
Sloss-Sheffield Steel & Iron Company	1	105,240	1	36,800	142,040
Woodward					
Woodward Iron Company	3	592,760	...	...	592,760
TOTAL	19	4,374,730	1	65,800	4,440,530
California					
Fontana					
Kaiser Steel Corporation	2	876,000	...	...	876,000
Colorado					
Pueblo					
Colorado Fuel and Iron Corporation	4	918,000	...	...	918,000
Illinois					
Chicago					
Interlake Iron Corporation	2	448,020	...	...	448,020
Granite City					
Granite City Steel Co.	2	449,680	...	...	449,680
South Chicago					
International Harvester Company	3	719,710	...	...	719,710
Republic Steel Corporation	1	450,000	...	...	450,000
United States Steel Company	11	4,196,700	...	...	4,196,700
Youngstown Sheet and Tube Company	3	684,000	...	...	684,000
TOTAL	22	6,948,110	...	...	6,948,110
Indiana					
East Chicago					
Youngstown Sheet and Tube Company	2	779,200	...	...	779,200
Gary					
United States Steel Company	12	4,721,400	...	...	4,721,400
Indiana Harbor					
Inland Steel Company	8	2,638,950	...	...	2,638,950
TOTAL	22	8,139,550	...	...	8,139,550
Kentucky					
Ashland					
Armco Steel Corporation	3	777,000	...	...	777,000
Maryland					
Sparrows Point					
Bethlehem Steel Company	8	3,252,000	...	...	3,252,000
Massachusetts					
Everett					
Eastern Gas and Fuel Associates	1	200,000	...	...	200,000
Michigan					
Dearborn					
Ford Motor Company	3	939,600	...	...	939,600
River Rouge					
Great Lakes Steel Corporation	3	1,100,000	...	...	1,100,000
TOTAL	6	2,039,600	...	...	2,039,600
Minnesota					
Duluth					
American Steel & Wire Company	2	449,400	...	...	449,400
Interlake Iron Corporation	1	131,660	...	...	131,660
TOTAL	3	581,060	...	...	581,060
New York					
Buffalo					
Hanna Furnace Corporation	3	660,000	1	120,000	780,000
Republic Steel Corporation	2	618,000	...	...	618,000
Lackawanna					
Bethlehem Steel Company	6	2,472,000	...	...	2,472,000
North Tonawanda					
Tonawanda Iron Division	1	171,000	...	...	171,000
Tonawanda					
Colorado Fuel & Iron Corporation	2	390,000	...	...	390,000
Troy					
Republic Steel Corporation	1	263,000	...	...	263,000
TOTAL	15	4,574,000	1	120,000	4,694,000
Ohio					
Campbell					
Youngstown Sheet and Tube Company	4	1,450,800	...	...	1,450,800
Canton					
Republic Steel Corporation	1	235,000	...	...	235,000
Cleveland					
American Steel & Wire Company	2	530,000	...	...	530,000
Jones & Laughlin Steel Corporation	2	540,000	...	...	540,000
Republic Steel Corporation	5	1,685,000	...	...	1,685,000
Hamilton					
Armco Steel Corporation	2	564,000	...	...	564,000
Hubbard					
Youngstown Sheet and Tube Company	1	200,400	...	...	200,400
Jackson					
Globe Iron Company	...	...	1	90,000	90,000
Jackson Iron & Steel Company	...	...	1	93,000	93,000
Lorain					
National Tube Company	5	1,818,400	...	...	1,818,400
Lowellville					
Sharon Steel Corporation	1	148,620	...	...	148,620
Martins Ferry					
Newport Steel Corporation	1	144,000	...	...	144,000
Massillon					
Republic Steel Corporation	1	238,000	...	...	238,000
Portsmouth					
Detroit Steel Corporation	1	259,200	...	...	259,200
Steubenville					
Wheeling Steel Corporation	5	1,444,500	...	...	1,444,500
Struthers					
Pittsburgh Coke & Chemical Company	1	182,500	...	...	182,500
Toledo					
Interlake Iron Corporation	2	497,500	...	...	497,500
Warren					
Republic Steel Corporation	1	516,000	...	...	516,000
Youngstown					
Republic Steel Corporation	5	1,660,000	...	...	1,660,000
United States Steel Company	6	1,891,500	...	...	1,891,500
Youngstown Sheet and Tube Company	2	501,500	...	...	501,500
TOTAL	48	14,507,220	2	183,000	14,690,220
Pennsylvania					
Aliquippa					
Jones & Laughlin Steel Corporation	5	1,800,000	...	...	1,800,000
Bethlehem					
Bethlehem Steel Company	7	2,160,000	...	...	2,160,000
Burdsboro					
Brooke Iron Company, E. & G.	1	151,200	...	...	151,200
Braddock					
United States Steel Company	7	2,602,700	...	...	2,602,700
Brackenridge					
Allegheny Ludlum Steel Corporation	1	96,000	...	...	96,000
Chester					
Chester Blast Furnace, Inc.	1	200,000	...	...	200,000
Clairton					
United States Steel Company	2	528,800	1	85,200	614,000
Donora					
American Steel & Wire Company	2	450,000	...	...	450,000
Duquesne					
United States Steel Company	5	1,346,200	1	105,200	1,451,400
Erie					
Interlake Iron Corporation	1	167,580	...	...	167,580
Etna					
United States Steel Company	...	...	2	145,000	145,000
Farrell					
Sharon Steel Corporation	2	561,000	...	...	561,000
Johnstown					
Bethlehem Steel Company	5	1,494,000	2	180,000	1,674,000
McKeesport					
National Tube Company	4	1,280,300	...	...	1,280,300
Midland					
Crucible Steel Company of America	2	532,900	...	...	532,900
Monessen					
Pittsburgh Steel Company	3	954,000	...	...	954,000
Neville Island					
Pittsburgh Coke & Chemical Company	1	291,600	...	...	291,600
Palmerton					
New Jersey Zinc Company	...	...	2	112,000	112,000
Pittsburgh					
Jones & Laughlin Steel Corporation	6	1,872,000	...	...	1,872,000
Rankin					
United States Steel Company	6	2,133,000	...	...	2,133,000
Sharpeville					
Shenango Furnace Company	2	417,300	...	...	417,300
Sheridan					
Lavino and Company, E. J.	...	...	1	51,100	51,100
Steelton					
Bethlehem Steel Company	3	792,000	...	...	792,000
Swedeland					
Alan Wood Steel Company	2	454,800	...	...	454,800
TOTAL	68	20,284,480	9	678,500	20,962,980
Tennessee					
Lyles-Wrigley					
Tennessee Products & Chemical Corp.	1	40,320	...	...	40,320
Rockwood					
Tennessee Products & Chemical Corp.	2	102,190	...	...	102,190
TOTAL	3	142,510	...	...	142,510
Texas					
Houston					
Sheffield Steel Corporation	1	274,000	...	...	274,000
Lone Star					
Lone Star Steel Company	1	366,600	...	...	366,600
Rusk					
Valencia Iron & Chemical Corporation	1	27,000	...	...	27,000
TOTAL	3	667,600	...	...	667,600
Utah					
Geneva					
Geneva Steel Company	3	1,200,000	...	...	1,200,000
Ironton					
Kaiser & Frazer Parts Corporation	1	300,000	...	...	300,000
Geneva Steel Company	1	199,200	...	...	199,200
TOTAL	5	1,699,200	...	...	1,699,200
Virginia					
Lynchburg					
Lavino and Company, E. J.	...	...	1	51,100	51,100
West Virginia					
Benwood					
Wheeling Steel Corporation	1	234,000	...	...	234,000
Weirton					
Weirton Steel Company	3	1,240,000	...	...	1,240,000
TOTAL	4	1,474,000	...	...	1,474,000
GRAND TOTAL	236	71,455,060	14	1,098,400	72,553,460

(a) Furnace included under pig iron.

Coke

Rise to an alltime high in blast furnace capacity sets off expansion that pushes coke producing facilities to record levels

TO SUPPORT the record capacity of the nation's blast furnaces, the country's coke producing capacity has been pushed to a record high level.

On Jan. 1, 1951, coke making capacity in the United States was 66,784,640 net tons, and it was still growing. Increases are shown in beehive capacity as well as for coal chemical recovery ovens.

On Jan. 1, 1951, there were 5540 beehives with a total annual capacity of 3,861,750 net tons, and 12,743 coal chemical recovery ovens (sometimes referred to as by-product ovens) with a total annual capacity of 62,922,890 tons.

COKE CAPACITY BY PLANT LOCATION AND OPERATING COMPANY

	BEEHIVE		OTHER		Total annual capacity (N. T.)
	No. of ovens	Annual capacity (N. T.)	No. of ovens	Annual capacity (N. T.)	
Alabama					
Birmingham					
Republic Steel Corporation			57	250,000	250,000
Fairfield					
Tennessee Coal, Iron & Railroad Co.			572	2,945,550	2,945,550
Gadsden					
Republic Steel Corporation			102	565,000	565,000
North Birmingham					
Sloss Sheffield Steel & Iron Company			120	678,000	678,000
Woodward					
Woodward Iron Company			226	830,000	830,000
TOTAL			1,077	5,268,550	5,268,550
California					
Fontana					
Kaiser Steel Corporation			135	552,000	552,000
Colorado					
Pueblo					
Colorado Fuel and Iron Corporation			266	1,220,000	1,220,000
Illinois					
Chicago					
Interlake Iron Corporation			120	398,600	398,600
Granite City					
Granite City Steel Company			49	310,000	310,000
Joliet					
United States Steel Company			280	1,071,520	1,071,520
South Chicago					
International Harvester Company			133	600,000	600,000
Republic Steel Corporation			75	460,000	460,000
Youngstown Sheet and Tube Co.			70	444,000	444,000
TOTAL			727	3,284,120	3,284,120
Indiana					
East Chicago					
Youngstown Sheet and Tube Co.			120	648,000	648,000
Gary					
United States Steel Company			1,148	5,855,100	5,855,100
Indiana Harbor					
Inland Steel Company			418	2,143,400	2,143,400
TOTAL			1,686	8,646,500	8,646,500
Maryland					
Sparrows Point					
Bethlehem Steel Company			551	2,928,000	2,928,000
Massachusetts					
Everett					
Eastern Gas and Fuel Associates			204	1,112,000	1,112,000
Michigan					
Dearborn					
Ford Motor Company			183	1,314,000	1,314,000
River Rouge					
Great Lakes Steel Corporation			146	1,120,000	1,120,000
TOTAL			329	2,434,000	2,434,000
Minnesota					
Duluth					
American Steel & Wire Company			114	483,600	483,600
Interlake Iron Corporation			61	310,000	310,000
TOTAL			175	793,600	793,600
New York					
Buffalo					
Donner-Hanna Coke Corporation			216	1,200,000	1,200,000
Lackawanna					
Bethlehem Steel Company			383	2,022,000	2,022,000
TOTAL			599	3,222,000	3,222,000
Ohio					
Campbell					
Youngstown Sheet and Tube Co.			306	1,320,000	1,320,000
Canton					
Republic Steel Corporation			62	240,000	240,000
Cleveland					
American Steel & Wire Company			180	834,670	834,670
Jones & Laughlin Steel Corporation			100	360,000	360,000
Republic Steel Corporation			279	1,345,000	1,345,000
Hamilton					
Armco Steel Corporation			110	558,000	558,000
Ohio (Continued)					
Lorain					
National Tube Company			385	1,766,750	1,766,750
Massillon					
Republic Steel Corporation			49	215,000	215,000
Portsmouth					
Detroit Steel Corporation			108	480,000	480,000
Toledo					
Interlake Iron Corporation			94	372,600	372,600
Warren					
Republic Steel Corporation			141	870,000	870,000
Youngstown					
Republic Steel Corporation			197	1,095,000	1,095,000
Youngstown Sheet and Tube Co.			84	372,000	372,000
TOTAL			2,095	9,829,020	9,829,020
Pennsylvania					
Aliquippa					
Jones & Laughlin Steel Corporation	240	252,000	293	1,800,000	2,052,000
Bethlehem					
Bethlehem Steel Company			416	1,680,000	1,680,000
Brownsville Junction					
Republic Steel Corporation	296	215,000			215,000
Clairton					
United States Steel Company			1,567	7,443,200	7,443,200
Erie					
Interlake Iron Corporation			72	275,600	275,600
Isabella					
Weirton Coal Company	136	120,000			120,000
Johnstown					
Bethlehem Steel Company			436	2,268,000	2,268,000
Midland					
Crucible Steel Company of America			184	720,000	720,000
Monessen					
Pittsburgh Steel Company	574	426,000	74	500,000	926,000
Mount Pleasant					
Carpentertown Coal & Coke Co.	585	375,000			375,000
Neville Island					
Pittsburgh Coke & Chemical Co.			105	685,000	685,000
Pittsburgh					
Jones & Laughlin Steel Corporation			360	1,440,000	1,440,000
Steelton					
Bethlehem Steel Company			130	648,000	648,000
Swedeland					
Alan Wood Steel Company			151	600,000	600,000
Various					
United States Steel Company	2,912	2,073,750			2,073,750
TOTAL	4,743	3,461,750	3,788	18,059,800	21,521,550
Tennessee					
Chattanooga					
Tennessee Products & Chemical Corp.			44	240,000	240,000
Texas					
Houston					
Sheffield Steel Corporation			47	252,000	252,000
Lone Star					
Lone Star Steel Company			78	438,000	438,000
TOTAL			125	690,000	690,000
Utah					
Dragerton					
Kaiser & Frazer Parts Corporation	500	300,000			300,000
Geneva					
Geneva Steel Company			252	1,012,300	1,012,300
Ironton					
Geneva Steel Company			56	200,000	200,000
Sunnyside					
Kaiser Steel Corporation	297	100,000			100,000
TOTAL	797	400,000	308	1,212,300	1,612,300
West Virginia					
East Steubenville					
Wheeling Steel Corporation			251	1,296,000	1,296,000
Fairmont					
Sharon Steel Corporation			60	225,000	225,000
Morgantown					
Sharon Steel Corporation			74	400,000	400,000
Weirton					
Weirton Steel Company			249	1,510,000	1,510,000
TOTAL			634	3,431,000	3,431,000
GRAND TOTAL	5,540	3,861,750	12,743	62,922,890	66,784,640

The need for additional coke to support a record high in blast furnace capacity caused some of the old beehives to be pressed back into service. On Jan. 1, 1948, there were in use only 3790 beehives, with a total capacity of 2,806,350 net tons. Capacity on Jan. 1, 1950, was 3,185,750 tons. All of the beehive capacity is in two states: Pennsylvania with 4743 ovens totaling 3,461,750 tons, and Utah, with 797 ovens totaling 400,000 tons.

Growth in coke capacity had carried the number of coal chemical recovery ovens from 11,982 on Jan. 1, 1948, to 12,743 on Jan. 1, 1951, and capacity

TREND IN COKE CAPACITY—(Net Tons)

As of Jan. 1	By-product	Beehive	Total
1951	62,922,890	3,861,750	66,784,640
1950	62,283,490	3,185,750	65,469,240
1949	61,572,750	3,345,750	64,918,500
1948	59,699,490	2,806,350	62,505,840
1947	57,774,240	2,560,350	60,280,590
1946	57,614,390	2,806,350	60,420,740
1945	57,409,690	3,446,350	60,856,040
1944	56,574,430	3,336,550	59,910,980
1943	51,707,830	5,756,400	57,464,230
1942	50,291,830	4,239,975	54,531,805

of them from 59,699,490 net tons to 62,922,890 tons. On Jan. 1, 1950, capacity was 62,283,490 tons.

Installation of the new coal chemical recovery ovens is occurring in ten states. Heaviest concentration of new capacity was in the Midwest during 1950. In 1951, construction of coke ovens is largely in the East, although there are installations scheduled for the West and the South.

COKE CAPACITY BY COMPANIES

	BEEHIVE		OTHER		Total annual capacity (N. T.)
	No. of ovens	Annual capacity (N. T.)	No. of ovens	Annual capacity (N. T.)	
Companies:					
Alan Wood Steel Company			151	600,000	600,000
Armco Steel Corporation			110	558,000	558,000
Sheffield Steel Corporation			47	252,000	252,000
TOTAL			157	810,000	810,000
Bethlehem Steel Company			1,916	9,546,000	9,546,000
Colorado Fuel and Iron Corporation			266	1,220,000	1,220,000
Crucible Steel Company of America			184	720,000	720,000
Detroit Steel Corporation			108	480,000	480,000
Donner Hanna Coke Corporation			216	1,200,000	1,200,000
Eastern Gas and Fuel Associates			204	1,112,000	1,112,000
Ford Motor Company			183	1,314,000	1,314,000
Granite City Steel Co.			49	310,000	310,000
Inland Steel Company			418	2,143,400	2,143,400
Interlake Iron Corporation			347	1,356,800	1,356,800
International Harvester Company			133	600,000	600,000
Jones & Laughlin Steel Corporation	240	252,000	753	3,600,000	3,852,000
Kaiser Steel Corporation	297	100,000	135	552,000	652,000
Kaiser & Frazer Parts Corporation	500	300,000			300,000
Lone Star Steel Company			78	438,000	438,000
National Steel Corporation:					
Great Lakes Steel Corporation			146	1,120,000	1,120,000
Weirton Coal Company	136	120,000			120,000
Weirton Steel Company			249	1,310,000	1,310,000
TOTAL	136	120,000	395	2,630,000	2,750,000
Pittsburgh Coke & Chemical Company			105	685,000	685,000
Pittsburgh Steel Company	574	426,000	74	500,000	926,000
Republic Steel Corporation	296	215,000	962	5,040,000	5,255,000
Sharon Steel Corporation			134	625,000	625,000
Carpentertown Coal & Coke Co.	585	375,000			375,000
TOTAL	585	375,000	134	625,000	1,000,000
Sloss Sheffield Steel & Iron Company			120	678,000	678,000
Tennessee Products & Chemical Corp.			44	240,000	240,000
United States Steel Corporation:					
American Steel & Wire Company			294	1,318,270	1,318,270
Geneva Steel Company			308	1,212,300	1,212,300
National Tube Company			385	1,766,750	1,766,750
Tennessee Coal, Iron & Railroad Co.			572	2,945,550	2,945,550
United States Steel Company	2,912	2,073,750	2,995	14,369,820	16,443,570
TOTAL	2,912	2,073,750	4,554	21,612,690	23,686,440
Wheeling Steel Corporation			251	1,296,000	1,296,000
Woodward Iron Company			226	830,000	830,000
Youngstown Sheet and Tube Company			580	2,784,000	2,784,000
GRAND TOTAL	5,540	3,861,750	12,743	62,922,890	66,784,640

Company Names and Addresses

Acme Steel Co.
2840 Archer Ave., Chicago 8, Ill.
Agalay Tubing Co.
P. O. Box 99, Sheepshead Bay Station, Brooklyn 29, N. Y.
Alan Wood Steel Co.
Conshohocken, Pa.
Algoma Steel Corp. Ltd.
Sault Ste. Marie, Ontario, Can.
Allegheny Ludlum Steel Corp.
Brackenridge, Pa.
Alloy Metal Wire Co.
Prospect Park, Pa.
American Chain & Cable Co. Inc.
929 Connecticut Ave.
Bridgeport 2, Conn.
American Locomotive Co.
30 Church St., New York, N. Y.
American Metal Products Co.
5959 Linsdale Ave.
Detroit 4, Mich.
American Pipe & Steel Corp.
2201 W. Commonwealth Ave.
Alhambra, Calif.
American Shim Steel Co.
Second Ave. & Sixth St.
New Kensington, Pa.
American Steel & Wire Co.
Rockefeller Bldg.
Cleveland, 13, O.
American Sweda Iron Corp.
400 Railroad St., Danville, Pa.
Ames & Co., W.
417 Communipaw Ave.
Jersey City 4, N. J.
Anchor Drawn Steel Co.
Latrobe, Pa.
Angell Nail & Chaplet Co.
4580 E. 71st St., Cleveland 5, O.
Armco Steel Corp., Middletown, O.
Atlantic Industries Ltd.
Amherst, Nova Scotia
Atlantic Steel Co.
P. O. Box 1714, Atlanta 1, Ga.
Atlantic Wire Co.
1 Church St., Branford, Conn.
Atlas Steels Ltd.
Welland, Ontario, Canada
Babcock & Wilcox Tube Co.
Beaver Falls, Pa.
Baldwin-Lima-Hamilton Corp.
Burnham, Mifflin County, Pa.
Basalt Rock Co.
Napa, Calif.
Bethlehem Steel Co., Bethlehem, Pa.
Bethlehem Pacific Coast Steel Corp.
San Francisco 19, Calif.
Blair Strip Steel Co.
1209 Butler Ave., New Castle, Pa.
Bliss & Laughlin Inc., Harvey, Ill.
Boiardi Steel Corp., Milton, Pa.
Borg-Warner Corp.
310 South Michigan Ave.
Chicago 4, Ill.
Braeburn Alloy Steel Corp.
Braeburn, Pa.
Brainard Steel Co., Warren, O.
Brooke Iron Co. (E. & G.)
Birdsboro, Pa.
Buffalo Bolt Co.
101 East Ave.
North Tonawanda, N. Y.
Buffalo Steel Co.
Tonawanda, N. Y.
Bundy Tubing Co.
8109 E. Jefferson Ave.
Detroit 14, Mich.
Burlington Steel Co. Ltd.
Sherman Ave., North Hamilton, Ontario, Canada
Byers Company, A. M.
Clark Bldg., Pittsburgh 22, Pa.
California Cold Rolled Steel Corp.
7140 Anaheim-Telegraph Road
Los Angeles 22, Calif.
California Wire Cloth Corp.
1001 22nd Ave., Oakland, Calif.
Canadian Car & Foundry Co. Ltd.
621 Craig St., West Montreal, Quebec, Canada
Canadian Furnace Co. Ltd.
Port Colborne, Ontario, Canada
Canadian Tube & Steel Products Ltd., 5765 Hamilton St.
Montreal, P. Q., Canada
Carpenter Steel Co.
101 West Bern St., Reading, Pa.
Carpentertown Coal & Coke Co.
Mount Pleasant, Pa.
Case Company, J. I., Racine, Wis.
Cedarburg Wire, Wire Nail & Screw Co., Cedarburg, Wis.
Central Iron & Steel Co.
Harrisburg, Pa.
Central Steel Tube Co.
Box 190, Clinton, Iowa
Chester Blast Furnace Inc.
Chester, Pa.
Chicago Steel & Wire Co.
10257 Torrence Ave.
Chicago 17, Ill.
Claymont Steel Corp.
Claymont, Del.
Cleveland Cold Rolling Mills Co.
Stroud Road, R.F.D.-1, Berea, O.
Cold Metal Products Co.
2131 Wilson Ave.
Youngstown 1, O.
Colonial Steel Co.
2400 Grant Bldg.
Pittsburgh 19, Pa.
Colorado Fuel & Iron Corp.
Continental Oil Bldg.
Denver 2, Colo.
Columbia Steel Co.
Russ Bldg., San Francisco 6, Calif.
Columbia Steel & Shafting Co.
P. O. Box 1557, Pittsburgh 30, Pa.
Columbia Tool Steel Co.
Lincoln Highway & State St.
Chicago Heights, Ill.
Compressed Steel Shafting Co.
1587 Hyde Park Ave.
Readville, Mass.
Connors Steel Co.
Birmingham 1, Ala.
Consolidated Western Steel Corp.
Russ Bldg., San Francisco 6, Calif.
Continental Steel Corp.
Kokomo, Ind.
Copperweld Steel Co., Glassport, Pa.
Crown Cork & Seal Co. Inc.
1200 S. Newkirk St., Baltimore
Crucible Steel Co. of America
405 Lexington Ave.
New York 17, N. Y.
Cumberland Steel Co.
Cumberland, Md.
Cuyahoga Steel & Wire Co.
Longwood Ave., Maple Heights
Cleveland 5, O.
Davis Wire & Cable Corp., K. H.
2417 E. 23rd St.
Los Angeles 11, Calif.
Detroit Steel Corp.
P. O. Box D, Porter Sta.
Detroit 9, Mich.
Detroit Tube & Steel Co.
Box A—Grand River Station
Detroit 8, Mich.
Disston & Sons Inc., Henry
126 Tacony
Philadelphia 35, Pa.
Dominion Foundries & Steel Ltd.
Hamilton, Ontario, Canada
Dominion Steel & Coal Corp. Ltd.
Sydney, N. S., Canada
Donner-Hanna Coke Corp.
Abby & Mystic Sts.
Buffalo 20, N. Y.
Driscoll Wire Co., Shelton, Conn.
Driver Co., Wilbur B.
150 Riverside Ave.
Newark 4, N. J.
Eastern Gas & Fuel Associates
250 Stuart St., Boston 16, Mass.
Eastern Stainless Steel Corp.
P. O. Box 1975, Baltimore 3, Md.
Edgewater Steel Co.
P. O. Box 478 Pittsburgh 30, Pa.
Elca Steel Products Co.
Newcastle, Pa.
Electroweld Steel Corp.
505 W. Foothill Rd.
Azusa, Calif.
Elliott Brothers Steel Co.
New Castle, Pa.
Empire Steel Co., Mansfield, O.
Erie Forge Co., Erie, Pa.
Falls Hollow Staybolt Co.
7 Portage Trail
Cuyahoga Falls, O.
Firth-Sterling Steel & Carbide Corp.
2201-3299 Demler Road
McKeesport, Pa.
Fitzsimons Steel Co.
1623 Wilson Ave.
Youngstown 8, O.
Follansbee Steel Corp.
Third and Liberty Aves.
Pittsburgh, Pa.
Ford Motor Co.
3000 Schaefer Road
Dearborn, Mich.
Formed Tubes Inc.
Sturgis, Mich.
Fort Howard Steel & Wire
State & Ninth Sts.
Green Bay, Wis.
Fretz-Moon Tube Co. Inc.
Butler, Pa.
Geneva Steel Co., Geneva, Utah
Globe Iron Co., Jackson, O.
Globe Steel Tubes Co.
3839 W. Burnham St.
Milwaukee 4, Wis.
Granite City Steel Co.
20th and Madison Ave.
Granite City, Ill.
Great Lakes Steel Corp.
Tecumseh Rd., Ecorse
Detroit 18, Mich.

COMPANY NAMES AND ADDRESSES (continued)

Greer Steel Co., Dover, O.
Griffin Manufacturing Co.
Cherry and Huron Sts., Erie, Pa.
Hanna Furnace Corp.
Ecorse, Detroit 18, Mich.
Harrisburg Steel Corp.
Harrisburg, Pa.
Heller Brothers Co.
865 Mt. Prospect Ave.
Newark 4, N. J.
Heppenstall Co.
4620 Hatfield St.
Pittsburgh 1, Pa.
Highland Iron & Steel Inc.
Terre Haute, Ind.
Hind Steel Company Inc.
2146 Stanley Terrace
Union, N. J.
Hofmann Industries Inc.
Sinking Spring, Pa.
Igoe Brothers Inc.
Avenue A & Rainier St.
Newark 5, N. J.
Industrial Forge & Steel Inc.
Canton, O.
Inland Steel Co.
38 S. Dearborn St.
Chicago 3, Ill.
Interlake Iron Corp.
1900 Union Commerce Bldg.
Cleveland 14, O.
International Harvester Co.
180 N. Michigan Ave.
Chicago 1, Ill.
Isaacson Iron Works
P. O. Box 3028
Seattle 14, Wash.
Ivins Steel Tube Works, Ellwood
Oak Lane Station
Philadelphia, Pa.
Jackson Iron & Steel Co.
Jackson, O.
Jersey Shore Steel Co.
Jersey Shore, Pa.
Jessop Steel Co., Washington, Pa.
Johnson Steel & Wire Co.
53 Wiser Ave.
Worcester 1, Mass.
Jones & Laughlin Steel Corp.
Third Ave. & Ross St.
Pittsburgh 30, Pa.
Joslyn Mfg. & Supply Co.
20 North Wacker Drive
Chicago 2, Ill.
Judson Steel Corp.
4200 Eastshore Highway
Emeryville, Calif.
Kaiser Steel Corp.
1924 Broadway
Oakland, Calif.
Kaiser & Frazer Parts Corp.
Provo, Utah
Kane Boiler Works Inc., E.
2722 Mechanic St.
Galveston, Texas
Keystone Drawn Steel Co.
Spring City, Pa.
Keystone Steel & Wire Co.
Peoria, Ill.
Kidd Drawn Steel Co.
Aliquippa, Pa.
Kilby Steel Co., Anniston, Ala.
Knoxville Iron Co.
Knoxville 2, Tenn.
Laclede Steel Co.
1317 Arcade Bldg.
St. Louis 1, Mo.
La Salle Steel Co.
919 N. Michigan Ave.
Chicago 80, Ill.
Latrobe Electric Steel Co.
2626 Ligonier St., Latrobe, Pa.
Lavino & Co., E. J.
1528 Walnut St.
Philadelphia 2, Pa.
Lockhart Iron & Steel Co.
P. O. Box 1165
Pittsburgh, Pa.
Lone Star Steel Co., Dallas, Texas
Lukens Steel Co., Coatesville, Pa.
McLouth Steel Corp.
300 S. Livernois, Detroit 17, Mich.
Macwhyte Co.
2900—14th Ave., Kenosha, Wis.
Madison Wire Company Inc.
Indian Church Road
Buffalo, N. Y.
Mahoning Valley Steel Co.
McKees Lane, Niles, O.
Manitoba Rolling Mill Co. Ltd.
875 Logan Ave.
Winnipeg, Manitoba, Canada
Mark & Co., Clayton
1900 Dempster St., Evanston, Ill.
Master Tank & Welding Ltd.
1612 Singleton St.
P. O. Box 5072
Dallas 8, Texas
Medart Co.
100 Potomac St., St. Louis 18, Mo.
Mercer Tube & Mfg. Co.
200 Cark St., Sharon, Pa.
Mesta Machine Co.
P. O. Box 1460, Pittsburgh 30, Pa.
Michigan Seamless Tube Co.
South Lyon, Mich.
Mid-States Steel & Wire Co.
Crawfordsville, Ind.
Midvale Co.
Nicetown, Philadelphia 40, Pa.
Missouri Rolling Mill Corp.
6800 Manchester Ave.
St. Louis 10, Mo.
Maltrup Steel Products Co.
Beaver Falls, Pa.
Monarch Steel Co. Inc.
McCarty & Sand St.
Indianapolis, Ind.
National Forge & Ordnance Co.
Irvine, Warren Co., Pa.
National-Standard Co.
Niles, Mich.
National Steel Corp.
2800 Grant Bldg.
Pittsburgh 19, Pa.
National Supply Co.
1400 Grant Bldg.
Pittsburgh 30, Pa.
National Tube Co.
Frick Bldg., Pittsburgh 30, Pa.
Naylor Pipe Co.
1230 E. 92nd St.
Chicago 19, Ill.
Nelsen Steel & Wire Co.
9400 Belmont Ave.
Franklin Park, Ill.
New England High Carbon Wire Co.
50 Howe Ave.
Millbury, Mass.
New Jersey Zinc Co.
160 Front St., New York 7, N. Y.
Newman-Crosby Steel Corp.
Pawtucket, R. I.
Newport News Shipbuilding & Dry Dock Co., Newport News, Va.
Newport Steel Corp.
Newport, Ky.
Nichols Wire & Aluminum Co.
Davenport, Iowa
Nikoh Tube Co.
5001 S. Kedzie Ave.
Chicago 32, Ill.
Niles Rolling Mill Co., Niles, O.
Northern Steel Inc.
44 School St., Boston, Mass.
Northwest Steel Rolling Mills Inc.
4315 Ninth Ave., N. W.
Seattle 7, Wash.
Northwestern Steel & Wire Co.
Sterling, Ill.
Ohio River Steel Corp.
Toronto, O.
Ohio Seamless Tube Co.
132-140 West Main St.
Shelby, O.
Oregon Steel Mills
5250 N. W. Front Ave.
Portland 10, Ore.
Pacific States Steel Corp.
Niles, Calif.
Pacific Tube Co.
5710 Smithway St.
Los Angeles 22, Calif.
Parkersburg Steel Co.
Parkersburg, W. Va.
Phoenix Iron & Steel Co.
121 Bridge St.
Phoenixville, Pa.
Phoenix Manufacturing Co.
Industry Ave., Joliet, Ill.
Pilgrim Drawn Steel Corp.
2208 Fisher Bldg., Detroit 2, Mich.
Pittsburgh Coke & Chemical Co.
1905 Grant Bldg.
Pittsburgh 19, Pa.
Pittsburgh Steel Co.
1600 Grant Bldg.
Pittsburgh 19, Pa.
Pittsburgh Tool Steel Wire Co.
Monaca, Pa.
Pittsburgh Tube Co.
323 Fourth Ave.
Pittsburgh 22, Pa.
Pollak Steel Co.
820 Temple Bar Bldg.
Cincinnati 2, O.
Poor & Co.
50 Church St., New York 17, N. Y.
Precision Drawn Steel Co.
3600 River Road, Camden, N. J.
Prentiss & Company, Geo. W.
439 Dwight St.
Holyoke, Mass.
Reconstruction Finance Corp.
400 Transit Tower
San Antonio 5, Texas
Reeves Steel & Manufacturing Co.
Dover, O.
Republic Steel Corp.
Republic Bldg., Cleveland 1, O.
Rhode Island Steel Corp.
Pawtucket, R. I.
Roebling's Sons Co., John A.
640 South Broad St.
Trenton 2, N. J.
Rome Strip Steel Co. Inc.
530 Henry St., Rome, N. Y.
Rotary Electric Steel Co.
8 Mile and Mound Roads
Detroit 20, Mich.
Seneca Wire & Mfg. Co.
Fostoria, O.
Service Steel Co.
1435 Franklin St.
Detroit 7, Mich.
Sharon Steel Corp., Sharon, Pa.
Sharon Tube Co.
249 N. Water Ave.
Sharon, Pa.
Sheet Steel Mills Inc.
Indianapolis, Ind.
Sheffield Steel Corp.
Sheffield Station
Kansas City, Mo.
Shenango Furnace Co.
812 Oliver Bldg.
Pittsburgh 22, Pa.
Shenango Tube Co.
200 Clarke St., Sharon, Pa.
Sherman Steel & Wire Co.
Sherman, Tex.
Sierra-Drawn Steel Co.
3821 E. Randolph St.
Los Angeles 22, Calif.
Simmons Co.
230 Park Ave.
New York 17, N. Y.
Simonds Saw & Steel Co.
470 Main St., Fitchburg, Mass.
Sloss-Sheffield Steel & Iron Co.
Birmingham, Ala.
Smith Corporation, A. O.
3533 N. 27th St.
Milwaukee 1, Wis.
Smith Corp. of Texas, A. O.
P. O. Box 9668
Houston, Tex.
South Chester Tube Co.
Front & Thurlow Sts.
Chester, Pa.
Southeastern Metals Co. Inc.
Box 1145, Decatur, Ala.
Southern Pipe & Casing Co.
P. O. Box C, Azusa, Calif.
Southwest Steel Rolling Mills
9901 S. Alameda St.
Los Angeles, Calif.
Spencer Wire Corp.
68 Pleasant St.
W. Brookfield, Mass.
Standard Tube Co.
14534 Woodward Ave.
Detroit, Mich.
Stanley Works, New Britain, Conn.
Steel Co. of Canada Ltd.
Hamilton, Ontario, Canada
Superior Drawn Steel Co.
Monaca, Pa.
Superior Sheet Steel Div.,
Parksburg Steel Co., Canton, O.
Superior Steel Corp.
Grant Bldg., Pittsburgh 19, Pa.
Superior Tube Co.
P. O. Drawer 191
Norristown, Pa.
Sweet's Steel Co., Williamsport, Pa.
Taylor Forge & Pipe Works
4735 W. 14th St., Cicero, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg.
Birmingham 2, Ala.
Tennessee Products & Chemical Corp., 412 American National Bank Bldg., Nashville 3, Tenn.
Texas Steel Co.
3901 Hemphill St.
Fort Worth, Texas
Thomas Steel Co., Warren, O.
Thompson Wire Co.
41 Mildred Ave.
Mattapan, Mass.
Timken Roller Bearing Co.
1835 Dueber Ave., S. W.
Canton 6, O.
Toledo Steel Tube Co.
2115 Smead Ave., Toledo 6, O.
Tonawanda Iron Div.
American Radiator & Standard Sanitary Corp., Buffalo, N. Y.
Tredegar Co., Richmond, Va.
Trent Tube Co.
East Troy, Wis.
Tube Reducing Corp.
520 Main Ave.
Wallington, N. J.
Union Electric Steel Corp.
2314 Oliver Bldg.
Pittsburgh 22, Pa.
Union Wire Rope Corp.
21st & Manchester Ave.
Kansas City 3, Mo.
United States Steel Corp.
71 Broadway, New York 6, N. Y.
U. S. Steel Co.
Carnegie Bldg., Pittsburgh, Pa.
Universal-Cyclops Steel Corp.
Bridgeville, Pa.
Vacuum Melt Inc.
Greenville, Pa.
Valencia Iron & Chemical Corp.
Rusk, Texas
Vanadium-Alloys Steel Co.
Latrobe, Pa.
Vancouver Rolling Mills Ltd.
490 SE Marine
Vancouver, Canada
Vulcan Crucible Steel Co.
West Aliquippa, Pa.
Wallace Barnes Co., Bristol, Conn.
Wallingford Steel Co.
Wallingford, Conn.
Washburn Wire Co.
Phillipsdale 16, R. I.
Washington Steel Corp.
9 E. Beau St., Washington, Pa.
Webb Wire Works
17 Liberty St.
New Brunswick, N. J.
Weirton Coal Co., Weirton, W. Va.
Weirton Steel Co., Weirton, W. Va.
West Virginia Steel & Mfg. Co.
Foot of 17th St.
Huntington, W. Va.
Western Automatic Machine Screw Co., Elyria, O.
Wheatland Tube Co.
Real Estate Trust Bldg.
Philadelphia 7, Pa.
Wheeling Steel Corp.
Wheeling, W. Va.
Whitney Apollo Corp., Apollo, Pa.
Wickwire Brothers Inc.
Cortland, N. Y.
Wilson Steel & Wire Co.
4840 So. Western Ave.
Chicago 9, Ill.
Woodward Iron Co.
Woodward, Ala.
Worcester Pressed Steel Co.
100 Barber Ave.
Worcester 6, Mass.
Wright Steel & Wire Co., G. F.
243 Stafford St.
Worcester 3, Mass.
Wyckoff Steel Co.
First National Bank Bldg.
Pittsburgh 30, Pa.
Youngstown Sheet & Tube Co.
Stambaugh Bldg.
Youngstown 1, O.

United States capacity to produce steel for ingots and castings is not only at an alltime high but it is headed still higher

Ingots

FOR THE FIRST TIME the American Iron & Steel Institute's directory shows the country's steelmaking capacity at more than 100 million tons. In rising to record levels, the nation's capacity to make steel for ingots and castings reached 104,502,680 net tons on Jan. 1, 1951. More capacity is under construction, and by the end of 1952 the world's largest steel industry will have at least 118 million tons of steelmaking capacity.

The Jan. 1, 1951, record capacity consisted of 91,310,850 net tons of open-hearth, 5,621,000 net tons of bessemer, 7,570,810 net tons of electric and 20 net tons of crucible. Included in the open-hearth figure

TEN LARGEST CAPACITIES: STEEL FOR INGOTS AND CASTINGS (Net Tons)

	Jan. 1, 1951	Jan. 1, 1948	Jan. 1, 1945
United States Steel Corp.	33,868,700	31,226,200	32,307,000
Bethlehem Steel Corp.	16,000,000	13,800,000	12,900,000
Republic Steel Corp.	8,967,000	8,600,000	9,791,000
Jones & Laughlin Steel Corp.	4,846,500	4,741,500	5,042,400
National Steel Corp.	4,750,000	4,050,000	3,900,000
Armco Steel Corp.	4,330,000	3,367,000	3,268,000
Youngstown Sheet & Tube Co.	4,250,000	4,002,000	4,002,000
Inland Steel Co.	3,750,000	3,400,000	3,400,000
Colorado Fuel & Iron Corp.	2,028,000	1,452,000	1,272,000
Wheeling Steel Corp.	1,860,000	1,409,000	1,960,000

TREND IN STEEL INGOT CAPACITY—(Net Tons)

As of Jan. 1	Open Hearth	Bessemer	Crucible	Electric	Total
1951	91,310,850	5,621,000	20	7,570,810	104,502,680
1950	86,984,490	5,537,000	20	6,871,290	99,392,800
1949	84,817,040	5,191,000	20	6,112,870	96,120,930
1948	83,610,690	5,226,000	20	5,396,750	94,233,460
1947	81,010,950	5,154,000	20	5,076,240	91,241,250
1946	81,236,250	5,154,000	20	5,500,290	91,890,560
1945	84,171,560	5,874,000	3,800	5,455,880	95,505,280
1944	82,223,610	6,074,000	3,800	5,350,880	93,652,290
1943	79,180,880	6,553,000	3,800	4,554,980	90,292,660
1942	78,107,260	6,721,400	3,800	3,737,510	88,569,970
1941	74,565,510	6,996,520	3,942	2,586,320	84,152,292
1940	73,721,592	6,009,920	5,354	1,882,630	81,619,496
1939	72,959,638	7,138,880	5,354	1,725,086	81,828,958
1938	71,472,370	7,212,800	9,610	1,490,528	80,185,628
1937	69,725,736	7,084,000	11,850	1,326,788	78,148,374
1936	68,946,826	8,058,400	11,850	1,147,221	78,164,300
1935	68,544,310	8,842,400	11,850	1,053,370	78,451,930

STEEL INGOT CAPACITY BY TYPE AND COMPANY

	OPEN HEARTH		BESSEMER		ELECTRIC AND CRUCIBLE		Total annual capacity (N. T.)
	No.	Annual capacity (N. T.)	No.	Annual capacity (N. T.)	No.	Annual capacity (N. T.)	
Kinds:							
Open hearth—basic	910	90,364,780					90,364,780
Open hearth—acid	37	946,070					946,070
Bessemer			(c) 41	5,621,000			5,621,000
Electric					256	7,570,810	7,570,810
Crucible					1	20	20
TOTAL	947	91,310,850	(c) 41	5,621,000	257	7,570,830	104,502,680
Steel for castings included above		230,080				124,790	354,870
Companies:							
Alan Wood Steel Co.	7	550,000					550,000
Allegheny Ludlum Steel Corporation	7	260,160			28	572,200	832,360
American Locomotive Co.	6	181,000					181,000
Armco Steel Corporation	25	2,620,000			9	396,000	3,016,000
Sheffield Steel Corp.	14	1,314,000					1,314,000
TOTAL	39	3,934,000			9	396,000	4,330,000
Atlantic Steel Company	3	188,000					188,000
Babcock & Wilcox Tube Company					2	64,800	64,800
Baldwin Lima-Hamilton Corp.	5	149,280			(a) 1	20	149,300
Barium Steel Corporation							
Central Iron & Steel Co.	5	360,000			1	46,000	406,000
Industrial Forge & Steel, Inc.	2	48,600					48,600
Phoenix Iron & Steel Co.	6	431,430					431,430
TOTAL	13	840,030			1	46,000	886,030
Bethlehem Steel Corp:							
Bethlehem Steel Co.	122	14,486,060	6	576,000	8	158,000	15,220,000
Bethlehem Pacific Coast Steel Corp.	13	540,000			2	240,000	780,000
TOTAL	135	15,026,060	6	576,000	10	398,000	16,000,000
Borg Warner Corporation					3	28,350	28,350
Boardi Steel Corp.					2	50,760	50,760
Braeburn Alloy Steel Corp.					2	20,730	20,730
Byers Company, A. M.					2	75,000	75,000
Carpenter Steel Company					7	81,360	81,360
Colorado Fuel & Iron Corp.	20	1,560,000					1,560,000
Claymont Steel Corp.	7	468,000					468,000
TOTAL	27	2,028,000					2,028,000
Columbia Tool Steel Co.					2	6,600	6,600
Connors Steel Co.					2	60,000	60,000
Continental Steel Corp.	5	393,760			4		393,760
Copperweld Steel Co.					7	554,400	554,400
Crucible Steel Company of America	11	667,000			24	286,440	1,153,440
Detroit Steel Corp.	10	650,000					650,000
Duston & Sons, Inc., Henry					2	25,000	25,000
Eastern Stainless Steel Corp.					4	12,000	12,000
Edgewater Steel Co.	3	146,470					146,470
Empire Steel Company	6	390,320					390,320
Erie Forge Company	3	85,000					85,000
Firth Sterling Steel and Carbide Corp.					3	20,040	20,040
Ford Motor Company	10	1,246,980			17	225,360	1,472,340
Granite City Steel Co.	13	720,000					720,000
Harrisburg Steel Corp.	3	100,750					100,750
Heppenstall Company	2	39,880			1	3,000	42,880
Inland Steel Company	26	3,750,000					3,750,000
International Harvester Company	11	900,000					900,000
Isaacson Iron Works					2	101,520	101,520
Jessop Steel Company					4	41,560	41,560
Jones & Laughlin Steel Corporation	30	3,927,000	6	918,000	1	1,500	4,846,500
Joslyn Mfg. & Supply Co.					5	37,500	37,500
Judson Steel Corporation	3	76,500					76,500
Kaiser Steel Corp.	7	1,200,000					1,200,000
Keystone Steel & Wire Co.	3	325,000					325,000
Kilby Steel Company					3	34,020	34,020
Knoxville Iron Company					2	58,000	58,000
Laclede Steel Company	4	387,840					387,840
Latrobe Electric Steel Co.					4	12,000	12,000
Lukens Steel Company	12	675,000					675,000
McLouth Steel Corporation					4	420,000	420,000
Mesta Machine Company	4	85,000			1	20,000	105,000
Midvale Company	6	324,430			9	92,940	417,370
National Forge & Ordnance Company					1	25,000	25,000
National Steel Corp.:							
Great Lakes Steel Corp.	17	2,450,000	(c) 2				2,450,000
Weirton Steel Co.	12	2,300,000	(c) 2				2,300,000
TOTAL	29	4,750,000	(c) 4				4,750,000
National Supply Co.					1	50,400	50,400
(b) Newport News Shipbuilding & Dry Dock Co.					1	12,000	12,000
Newport Steel Corp.	7	413,100			1	291,600	704,700
Northwest Steel Rolling Mills, Inc.					1	32,400	32,400
Northwestern Steel & Wire Co.					3	321,000	321,000
Ohio River Steel Corp.	4	121,200					121,200
Oregon Steel Mills					3	110,000	110,000
Pacific States Steel Corp.	2	140,000			2	91,300	231,300
Pittsburgh Steel Co.	12	1,072,000					1,072,000
Reconstruction Finance Corp.					5	163,000	360,000
Republic Steel Corp.	74	7,202,000	2	665,000	21	1,100,000	8,967,000
Roebling Sons Co., J. A.	9	204,870					204,870
Rotary Electric Steel Co.					5	423,000	423,000
Sharon Steel Corp.	19	1,381,400			2	60,000	1,441,400
Simonds Saw & Steel Co.					3	21,600	21,600
(b) Southwest Steel Rolling Mills					1	36,000	36,000
Stanley Works	3	188,280					188,280
Texas Steel Company					2	22,320	22,320
Timken Roller Bearing Company	3	201,600			5	345,600	547,200
Union Electric Steel Corp.					2	26,760	26,760
United States Steel Corp.:							
American Steel & Wire Company	26	2,068,000					2,068,000
Columbia Steel Co.	11	566,400			1	12,000	578,400
Geneva Steel Co.	9	1,440,000					1,440,000
National Tube Co.	15	2,226,000	6	1,188,000			3,414,000
Tennessee Coal, Iron & Railroad Company	21	2,920,000	(c) 5				2,920,000
United States Steel Co.	231	21,746,000	(d) 8	1,284,000	13	418,300	23,448,300
TOTAL	313	30,966,400	17	2,472,000	14	430,300	33,868,700
Universal-Cyclops Steel Corporation					4	34,120	34,120
Vacuum Melt, Inc.					3	1,800	1,800
Vanadium Alloys Steel Co.					3	11,910	11,910
Colonial Steel Co.					1	7,020	7,020
TOTAL					4	18,930	18,930
Vulcan Crucible Steel Co.					2	9,600	9,600
Washburn Wire Co.	4	93,000					93,000
Wheeling Steel Corp.	11	1,440,000	2	420,000			1,860,000
Youngstown Sheet and Tube Company	35	3,680,000	4	570,000			4,250,000
GRAND TOTAL	947	91,310,850	(c) 41	5,621,000	(f) 257	7,570,810	104,502,680

are 230,080 tons of capacity for producing steel for castings. Similarly, the electric and crucible figure includes 124,790 tons for steel for castings.

Although open-hearth capacity increased 9 per cent from Jan. 1, 1948, to Jan. 1, 1951, the number of open hearths dropped from 954 to 947. This emphasizes the growth in size of open hearths. In 1950, a Midwestern steel plant completed installation of an open hearth with a capacity of 550 tons per heat, three to four times that of many furnaces.

Size of electric furnaces installed has increased too. On Jan. 1, 1948, there were 222 electric furnaces with a total annual capacity of 5,396,750 net tons, or an average annual capacity of 24,309 tons per furnace. With 256 electric furnaces in existence on Jan. 1, 1951, and as their total capacity was 7,570,810 net tons, their average annual capacity was 29,573 tons per furnace.

The jump in electric furnace capacity from Jan. 1, 1948, to Jan. 1, 1951, was 40 per cent.

Crucible steel production had all but passed out of existence. As has been the case for the last several years the only remaining crucible furnace is the 20-ton one at Burnham, Pa.

Although open-hearth and electric steel capacities were at all-time high marks on Jan. 1, 1951, bessemer was not. The latter had risen some, however, over the last two years. On Jan. 1, 1951, bessemer capacity totaled 5,621,000 net tons, compared with 8,842,400 tons in 1934 and 1935. There were 41 bessemer converters on Jan. 1, 1951, an increase of two over Jan. 1, 1948. As was the case in 1948, ten of the converters on Jan. 1, 1951, were used only in melting charges for open hearths.

The large increase in steel capacity is distributed throughout all of the six steel producing districts of the United States. In each the 1951 capacity exceeded the 1939 capacity, and the capacity projected for 1953 will bring an increase over 1951 levels in each of the districts. Percentagewise, however, the Pittsburgh-Youngstown district and the Chicago district will have less in 1953 than in 1939 and 1951. This is because of the greater rate of growth in other districts.

STEEL INGOT CAPACITY BY PLANT LOCATION AND OPERATING COMPANY

	OPEN HEARTH		BESSEMER		ELECTRIC AND CRUCIBLE		Total annual capacity (N. T.)
	No.	Annual capacity (N. T.)	No.	Annual capacity (N. T.)	No.	Annual capacity (N. T.)	
Alabama							
Anniston							
Kilby Steel Co.	...	...	...	...	3	34,020	34,020
Birmingham							
Connors Steel Co.	...	...	...	...	2	60,000	60,000
Ensley							
Tennessee Coal, Iron & Railroad Company	9	1,568,000	(c) 3	...	...	...	1,568,000
Fairfield							
Tennessee Coal, Iron & Railroad Company	12	1,352,000	...	...	...	...	1,352,000
Gadsden							
Republic Steel Corp.	8	745,000	...	...	...	...	745,000
TOTAL	29	3,665,000	(c) 3	...	5	94,020	3,759,020
California							
Emeryville							
Judson Steel Corp.	3	76,500	...	...	...	...	76,500
Fontana							
Kaiser Steel Corp.	7	1,200,000	...	...	...	...	1,200,000
Los Angeles							
Bethlehem Pacific Coast Steel Corp.	3	84,000	...	...	2	240,000	324,000
(b) Southwest Steel Rolling Mills	...	...	...	...	1	36,000	36,000
Niles							
Pacific States Steel Corp.	2	140,000	...	...	2	91,300	231,300
Pittsburg							
Columbia Steel Co.	7	364,700	...	...	...	...	364,700
South San Francisco							
Bethlehem Pacific Coast Steel Corp.	5	240,000	...	...	...	...	240,000
Torrance							
Columbia Steel Co.	4	201,700	...	...	1	12,000	213,700
National Supply Co.	...	...	...	...	3	50,400	50,400
TOTAL	31	2,306,900	...	...	9	429,700	2,736,600
Colorado							
Pueblo							
Colorado Fuel and Iron Corp.	16	1,320,000	...	...	...	...	1,320,000
Connecticut							
Bridgeport							
Stanley Works	3	188,280	...	...	...	...	188,280
Delaware							
Claymont							
Claymont Steel Corp.	7	468,000	...	...	...	...	468,000
Georgia							
Atlanta							
Atlantic Steel Co.	3	188,000	...	...	...	...	188,000
Illinois							
Alton							
Laclede Steel Co.	4	397,840	...	...	...	...	397,840
Chicago Heights							
American Locomotive Co.	3	78,000	...	...	...	...	78,000
Columbia Tool Steel Co.	...	...	...	...	2	6,600	6,600
Granite City							
Granite City Steel Co.	13	720,000	...	...	...	...	720,000
Peoria							
Keystone Steel & Wire Co.	3	325,000	...	...	...	...	325,000
South Chicago							
International Harvester Company	11	900,000	...	...	...	...	900,000
Republic Steel Corp.	4	500,000	...	...	9	600,000	1,100,000
United States Steel Co.	31	3,905,000	3	500,000	8	270,000	4,675,000
Sterling							
Northwestern Steel & Wire Company	...	...	...	...	3	321,000	321,000
TOTAL	69	6,825,840	3	500,000	22	1,197,600	8,523,440
Indiana							
East Chicago							
Youngstown Sheet and Tube Company	9	1,196,000	2	330,000	...	...	1,526,000
Fort Wayne							
Joslyn Mfg. & Supply Company	...	...	...	...	3	37,500	37,500
Gary							
United States Steel Co.	53	6,025,700	(c) 3	...	...	...	6,025,700
Indiana Harbor							
Inland Steel Company	36	3,750,000	...	...	...	...	3,750,000
Kokomo							
Continental Steel Corp.	5	393,760	...	...	...	...	393,760
New Castle							
Borg Warner Corp.	...	...	...	...	3	28,350	28,350
TOTAL	105	11,365,460	5	330,000	6	65,850	11,761,310
Kentucky							
Ashland							
Armco Steel Corporation	8	900,000	...	...	...	...	900,000
Newport							
Newport Steel Corp.	7	413,100	...	...	3	291,600	704,700
TOTAL	15	1,313,100	...	...	3	291,600	1,604,700
Maryland							
Baltimore							
Armco Steel Corporation	...	...	...	...	6	102,000	102,000
Colgate							
Eastern Stainless Steel Corp.	...	...	...	...	4	12,000	12,000
Sparrows Point							
Bethlehem Steel Co.	28	4,824,000	3	336,000	...	...	5,160,000
TOTAL	28	4,824,000	3	336,000	10	114,000	5,274,000
Massachusetts							
Worcester							
American Steel & Wire Company	4	250,000	...	...	...	...	250,000
Michigan							
Dearborn							
Ford Motor Company	10	1,246,580	...	...	17	225,360	1,471,940
Detroit							
Rotary Electric Steel Company	...	...	...	...	5	425,000	425,000
Ecorse							
Great Lakes Steel Corp.	17	2,450,000	(c) 2	...	...	...	2,450,000
Ferndale							
Allegheny Ludlum Steel Corporation	...	...	...	...	5	3,000	3,000
Trenton							
McLouth Steel Corp.	...	...	...	...	4	420,000	420,000
TOTAL	27	3,696,580	(c) 2	...	31	1,073,360	4,769,940
Minnesota							
Duluth							
American Steel & Wire Company	9	918,000	...	...	...	...	918,000
Missouri							
Kansas City							
Sheffield Steel Corp.	5	420,000	...	...	...	...	420,000

Steel (Ingots and Steel for Castings) (*Continued*)

	OPEN HEARTH		BESSEMER		ELECTRIC AND CRUCIBLE		Total annual capacity (N. T.)
	No.	Annual capacity (N. T.)	No.	Annual capacity (N. T.)	No.	Annual capacity (N. T.)	
New Jersey							
Harrison							
Crucible Steel Company of America	....	....	....	....	12	2,160	2,160
Roebling							
Roebling's Sons Co., J. A.	9	204,870	....	....	....	....	204,870
TOTAL	9	204,870	....	....	12	2,160	207,030
New York							
Buffalo							
Republic Steel Corp.	9	870,000	....	....	....	....	870,000
Dunkirk							
Allegheny Ludlum Steel Corporation	....	....	....	....	3	33,000	33,000
Lackawanna							
Bethlehem Steel Co.	30	3,920,000	....	....	....	....	3,920,000
Lockport							
Simonds Saw & Steel Co.	....	....	....	....	3	21,600	21,600
Syracuse							
Crucible Steel Company of America	....	....	....	....	6	56,280	56,280
Tonawanda							
Allegheny Ludlum Steel Corporation	....	....	....	....	2	4,500	4,500
Colorado Fuel & Iron Corp.	4	240,000	....	....	....	....	240,000
Watervliet							
Allegheny Ludlum Steel Corporation	....	....	....	....	3	25,000	25,000
TOTAL	43	5,030,000	....	....	17	140,380	5,170,380
Ohio							
Campbell							
Youngstown Sheet and Tube Company	12	1,302,000	2	240,000	....	....	1,542,000
Canton							
Industrial Forge & Steel, Inc.	2	48,600	....	....	....	....	48,600
Reconstruction Finance Corp.	....	....	....	....	5	350,000	350,000
Republic Steel Corp.	6	475,000	....	....	12	500,000	975,000
Timken Roller Bearing Co.	2	201,600	....	....	6	345,600	547,200
Cleveland							
Jones & Laughlin Steel Corp.	9	945,000	....	....	....	....	945,000
Republic Steel Corp.	15	1,637,000	....	....	....	....	1,637,000
Lorain							
National Tube Co.	12	1,350,000	3	900,000	....	....	2,250,000
Lowellville							
Sharon Steel Corp.	5	400,000	....	....	2	60,000	460,000
Mansfield							
Empire Steel Co.	6	390,320	....	....	....	....	390,320
Massillon							
Republic Steel Corp.	9	610,000	....	....	....	....	610,000
Middletown							
Armco Steel Corp.	11	1,312,000	....	....	2	228,000	1,540,000
Portsmouth							
Detroit Steel Corp.	10	650,000	....	....	....	....	650,000
Steubenville							
Wheeling Steel Corp.	11	1,440,000	....	....	....	....	1,440,000
Toronto							
Ohio River Steel Corp.	4	121,200	....	....	....	....	121,200
Warren							
Copperweld Steel Co.	....	....	....	....	7	554,400	554,400
Republic Steel Corp.	8	900,000	....	....	....	....	900,000
Youngstown							
Republic Steel Corp.	15	1,465,000	2	665,000	....	....	2,130,000
United States Steel Co.	15	1,700,000	2	784,000	....	....	2,484,000
Youngstown Sheet and Tube Co.	12	1,182,000	....	....	....	....	1,182,000
TOTAL	165	16,129,720	9	2,589,000	54	2,048,000	20,766,720
Oklahoma							
Sand Springs							
Sheffield Steel Corp.	1	54,000	....	....	....	....	54,000
Oregon							
Portland							
Oregon Steel Mills	....	....	....	....	3	110,000	110,000
Pennsylvania							
Aliquippa							
Jones & Laughlin Steel Corp.	5	1,182,000	3	582,000	....	....	1,764,000
Vulcan Crucible Steel Co.	....	....	....	....	2	9,600	9,600
Beaver Falls							
Babcock & Wilcox Tube Co.	....	....	....	....	2	64,800	64,800
Bethlehem							
Bethlehem Steel Co.	32	2,922,000	....	....	8	158,000	3,080,000
Brackenridge							
Allegheny Ludlum Steel Corp.	7	260,160	....	....	15	506,700	766,860
Braddock							
United States Steel Co.	16	2,080,400	....	....	....	....	2,080,400
Braeburn							
Braeburn Alloy Steel Corp.	....	....	....	....	2	20,730	20,730
Bridgeville							
Universal-Cyclops Steel Corp.	....	....	....	....	4	54,120	54,120
Burnham							
Baldwin-Lima-Hamilton Corp.	5	149,280	....	....	(a) 1	20	149,300
Butler							
Armco Steel Corporation	6	408,000	....	....	1	66,000	474,000
Carnegie							
Union Electric Steel Corporation	....	....	....	....	2	26,760	26,760
Clairton							
United States Steel Co.	12	870,000	....	....	....	....	870,000
Coatesville							
Lukens Steel Company	12	675,000	....	....	....	....	675,000
Donora							
American Steel & Wire Company	13	900,000	....	....	....	....	900,000

Steel (Ingots and Steel for Castings) (*Continued*)

	OPEN HEARTH		BESSEMER		ELECTRIC AND CRUCIBLE		Total annual capacity (N. T.)
	No.	Annual capacity (N. T.)	No.	Annual capacity (N. T.)	No.	Annual capacity (N. T.)	
Duquesne							
United States Steel Co.	27	1,800,000	....	....	4	142,800	1,942,800
Erie							
Erie Forge Company	3	85,000	....	....	....	....	85,000
Farrell							
Sharon Steel Corp.	14	981,400	....	....	....	....	981,400
Greenville							
Vacuum Melt, Inc.	....	....	....	....	3	1,800	1,800
Harmony Township							
Byers Company, A. M.	....	....	....	....	2	75,000	75,000
Harrisburg							
Central Iron & Steel Co.	5	360,000	....	....	1	46,000	406,000
Harrisburg Steel Co.	3	100,750	....	....	....	....	100,750
Irvine							
National Forge & Ordnance Company	....	....	....	....	3	25,000	25,000
Ivy Rock							
Alan Wood Steel Co.	7	550,000	....	....	....	....	550,000
Johnstown							
Bethlehem Steel Co.	21	1,788,000	3	240,000	....	....	2,028,000
United States Steel Co.	2	18,900	....	....	1	5,500	24,400
Latrobe							
American Locomotive Company	3	103,000	....	....	....	....	103,000
Latrobe Electric Steel Company	....	....	....	....	4	12,000	12,000
Vanadium-Alloys Steel Company	....	....	....	....	3	11,910	11,910
McKeesport							
Firth Sterling Steel & Carbide Corp.	....	....	....	....	3	20,040	20,040
National Tube Co.	3	876,000	3	288,000	....	....	1,164,000
Midland							
Crucible Steel Company of America	11	867,000	....	....	6	228,000	1,095,000
Milton							
Bourdi Steel Corp.	....	....	....	....	2	50,760	50,760
Monaca							
Colonial Steel Co.	....	....	....	....	1	7,020	7,020
Monessen							
Pittsburgh Steel Co.	12	1,072,000	....	....	....	....	1,072,000
Munhall							
United States Steel Co.	61	4,866,000	....	....	....	....	4,866,000
Oakmont							
Edgewater Steel Co.	3	146,470	....	....	....	....	146,470
Philadelphia							
Disston & Sons, Inc., Henry	....	....	....	....	2	25,000	25,000
Midvale Company	6	324,430	....	....	9	92,940	417,370
Phoenixville							
Phoenix Iron & Steel Co.	6	431,430	....	....	....	....	431,430
Pittsburgh							
Herppenstall Company	2	39,880	....	....	1	3,000	42,880
Jones & Laughlin Steel Corporation	16	1,800,000	3	336,000	1	1,500	2,137,500
Reading							
Carpenter Steel Co.	....	....	....	....	7	81,360	81,360
Steelton							
Bethlehem Steel Co.	11	1,032,000	....	....	....	....	1,032,000
Vandergrift							
United States Steel Co.	12	480,000	....	....	....	....	480,000
Washington							
Jessop Steel Company	....	....	....	....	4	41,560	41,560
West Homestead							
Mesta Machine Co.	4	85,000	....	....	1	20,000	105,000
TOTAL	340	27,254,100	12	1,446,000	(f) 95	1,797,920	30,498,020
Rhode Island							
Philipsdale							
Washburn Wire Co.	4	93,000	....	....	....	....	93,000
Tennessee							
Knoxville							
Knoxville Iron Co.	....	....	....	....	2	38,000	38,000
Texas							
Fort Worth							
Texas Steel Company	....	....	....	....	2	22,320	22,320
Houston							
Sheffield Steel Corporation	8	840,000	....	....	....	....	840,000
TOTAL	8	840,000	....	....	2	22,320	862,320
Utah							
Geneva							
Geneva Steel Co.	9	1,440,000	....	....	....	....	1,440,000
Virginia							
Newport News							
(b) Newport News Shipbuilding & Dry Dock Company	....	....	....	....	3	12,000	12,000
Washington							
Seattle							
Bethlehem Pacific Coast Steel Corp.	5	216,000	....	....	....	....	216,000
Isaacson Iron Works	....	....	....	....	2	101,520	101,520
Northwest Steel Rolling Mills, Inc.	....	....	....	....	1	32,400	32,400
TOTAL	5	216,000	....	....	3	133,920	349,920
West Virginia							
Benwood							
Wheeling Steel Corp.	....	....	2	420,000	....	....	420,000
Weirton							
Weirton Steel Co.	12	2,300,000	(c) 2	....	....	....	2,300,000
TOTAL	12	2,300,000	4	420,000	....	....	2,720,000
GRAND TOTAL	947	91,310,850	(c) 41	5,621,000	(f) 257	7,570,830	104,502,680

(a) Crucible furnace.
(b) Not described in this Directory.
(c) Used in melting charge for open hearth furnaces.
(d) Includes 3 converters used only in melting charge for open hearth furnaces.
(e) Includes 10 converters used only in melting charge for open hearth furnaces.
(f) Includes 1 crucible furnace, annual capacity, 20 tons.

FINISHED HOT-ROLLED STEEL CAPACITY BY STATES

Products	ANNUAL CAPACITY (N. T.)		
	Steel	Iron	Total
States:			
Alabama	3,633,900		3,633,900
California	2,402,020		2,402,020
Colorado	1,018,500		1,018,500
Connecticut	130,000		130,000
Delaware	300,000		300,000
Georgia	145,000		145,000
Illinois	6,549,240		6,549,240
Indiana	10,288,800	4,500	10,293,300
Kentucky	1,008,000		1,008,000
Maryland	4,889,940		4,889,940
Massachusetts	234,100		234,100
Michigan	4,547,300		4,547,300
Minnesota	247,300		247,300
Missouri	410,000		410,000
New Jersey	221,000		221,000
New York	4,172,030		4,172,030
Ohio	16,467,520	8,000	16,475,520
Oklahoma	43,200		43,200
Oregon	100,000		100,000
Pennsylvania	21,297,840	340,000	21,637,840
Rhode Island	122,200		122,200
Tennessee	90,000		90,000
Texas	698,000		698,000
Utah	1,595,000		1,595,000
Virginia	47,000		47,000
Washington	201,000		201,000
West Virginia	2,817,000		2,817,000
Wisconsin	24,000		24,000
GRAND TOTAL	83,699,890	352,500	84,052,390

In reaching alltime high, hot-rolling capacity of steel industry in United States expands at slightly faster pace than capacity for producing steel ingots. Hot-rolling capacity on Jan. 1, 1951, was 13 per cent above that of three years earlier

FINISHED HOT-ROLLED STEEL CAPACITY BY COMPANIES

Products	ANNUAL CAPACITY (N. T.)		
	Steel	Iron	Total
Companies:			
Acme Steel Company	545,000		545,000
Alan Wood Steel Company	431,100		431,100
Allegheny Ludlum Steel Corporation	314,650		314,650
American Chain & Cable Company, Inc.	175,000		175,000
American Locomotive Company	123,000		123,000
American Swedo Iron Corporation	12,000		12,000
Ames & Company, Inc., W.	35,000		35,000
Armco Steel Corporation	2,077,940		2,077,940
Sheffield Steel Corporation	1,013,200		1,013,200
TOTAL	3,091,140		3,091,140
Atlantic Steel Company	145,000		145,000
Babcock & Wilcox Tube Company	39,600		39,600
Baldwin Lima Hamilton Corporation	91,750		91,750
Barium Steel Corporation:			
Central Iron and Steel Company	288,000		288,000
Phoenix Iron & Steel Company	259,000		259,000
TOTAL	547,000		547,000
Bethlehem Steel Corporation:			
Bethlehem Steel Company	11,746,000		11,746,000
Bethlehem Pacific Coast Steel Corporation	622,000		622,000
TOTAL	12,368,000		12,368,000
Boardi Steel Corporation	80,000		80,000
Borg Warner Corporation	300,000		300,000
Braeburn Alloy Steel Corporation	3,200		3,200
Buffalo Bolt Company	65,600		65,600
Buffalo Steel Company	80,000		80,000
Byers Company, A. M.	210,000	310,000	520,000
Carpenter Steel Company	24,600		24,600
Colorado Fuel and Iron Corporation	1,162,500		1,162,500
Claymont Steel Corporation	300,000		300,000
TOTAL	1,462,500		1,462,500
Columbia Tool Steel Company	1,800		1,800
Connors Steel Company	94,000		94,000
Continental Steel Corporation	285,000		285,000
Copperweld Steel Company	375,000		375,000
Crucible Steel Company of America	670,100		670,100
Detroit Steel Corporation	180,000		180,000
Disston & Sons, Inc., Henry	38,600		38,600
Driver Company, Wilbur B.	6,000		6,000
Eastern Stainless Steel Corporation	18,000		18,000
Edgewater Steel Company	81,960		81,960
Empire Steel Company	144,000		144,000
Falls Hollow Staybolt Company		8,000	8,000
Firth Sterling Steel and Carbide Corporation	11,550		11,550
Ford Motor Company	1,120,000		1,120,000
Granite City Steel Company	490,000		490,000
Harrisburg Steel Corporation	75,000		75,000
Heller Brothers Company	18,000		18,000
Highland Iron & Steel, Inc.	40,500	4,500	45,000
Inland Steel Company	3,050,000		3,050,000
International Harvester Company	677,300		677,300
Jersey Shore Steel Company	30,000		30,000
Jessop Steel Company	20,000		20,000
Jones & Laughlin Steel Corporation	3,886,200		3,886,200
Joslyn Manufacturing & Supply Company	18,000		18,000
Judson Steel Corporation	54,000		54,000
Kaiser Steel Corporation	888,000		888,000
Keystone Steel & Wire Company	282,000		282,000
Knoxville Iron Company	90,000		90,000
Laclede Steel Company	427,500		427,500
Latrobe Electric Steel Company	5,500		5,500
Lockhart Iron and Steel Company	30,000	30,000	60,000
Lukens Steel Company	486,000		486,000
McLouth Steel Corporation	552,300		552,300
Mahoning Valley Steel Company	120,000		120,000
Midvale Company	60,000		60,000
Missouri Rolling Mill Corporation	70,000		70,000
National Steel Corporation:			
Great Lakes Steel Corporation	2,695,000		2,695,000
Weirton Steel Company	2,275,000		2,275,000
TOTAL	4,970,000		4,970,000
Newport Steel Corporation	480,000		480,000
Northern Steel Inc.	15,000		15,000
Northwest Steel Rolling Mills, Inc.	25,000		25,000
Northwestern Steel & Wire Company	218,000		218,000
Oregon Steel Mills	100,000		100,000
Pacific States Steel Corporation	155,000		155,000
Parkersburg Steel Company	36,000		36,000
Superior Sheet Steel Division	140,000		140,000
TOTAL	176,000		176,000
Phoenix Manufacturing Company	15,000		15,000
Pittsburgh Steel Company	660,000		660,000
Pollak Steel Company	90,000		90,000
Poor & Company	12,000		12,000
Reeves Steel and Manufacturing Company	75,000		75,000
Republic Steel Corporation	7,155,000		7,155,000
Roebling's Sons Company (John A.)	162,000		162,000
Rotary Electric Steel Company	180,000		180,000
Sharon Steel Corporation	645,000		645,000
Niles Rolling Mill Company	150,000		150,000
TOTAL	795,000		795,000
Sheet Steel Mills Inc.	55,000		55,000
Simmons Company	36,000		36,000
Simonds Saw and Steel Company	11,180		11,180
Stanley Works	130,000		130,000
Superior Steel Corporation	115,000		115,000
Sweet's Steel Company	104,000		104,000
Texas Steel Company	68,000		68,000
Timken Roller Bearing Company	329,500		329,500
Tredegar Company	47,000		47,000
United States Steel Corporation:			
American Steel and Wire Company	2,181,640		2,181,640
Columbia Steel Company	847,020		847,020
Geneva Steel Company	1,595,000		1,595,000
National Tube Company	2,759,800		2,759,800
Tennessee Coal, Iron and Railroad Company	2,954,900		2,954,900
United States Steel Company	17,194,860		17,194,860
TOTAL	27,533,220		27,533,220
Universal-Cyclops Steel Corporation	52,300		52,300
Vanadium Alloys Steel Company	6,000		6,000
Colonial Steel Company	7,840		7,840
TOTAL	13,840		13,840
Vulcan Crucible Steel Company	3,000		3,000
Washburn Wire Company	122,200		122,200
West Virginia Steel and Mfg. Company	140,000		140,000
Wheeling Steel Corporation	1,566,000		1,566,000
Whitney Apollo Corporation (The)	132,000		132,000
Wickwire Brothers, Inc.	35,000		35,000
Youngstown Sheet and Tube Company	3,383,200		3,383,200
GRAND TOTAL	83,699,890	352,500	84,052,390

Steel...

EXPANSION in the nation's steel ingot capacity necessitated an increase in the country's rolling capacity.

American Iron & Steel Institute figures show the steel industry's capacity for hot-rolling steel rose from 73,872,430 net tons on Jan. 1, 1948, to an all-time record of 83,699,890 net tons on Jan. 1, 1951.

Installation of new hot-rolling capacity and expansion of existing equipment has gone at a little faster pace than the expansion of steel ingot capacity. On Jan. 1, 1948, there was 78.7 per cent as much hot-rolling capacity as there was steel ingot capacity, but by Jan. 1, 1951, the percentage had risen to 80.4.

This rise in hot-rolling capacity was 13 per cent. In the same length of time, steel ingot capacity rose 11 per cent.

FINISHED HOT-ROLLED STEEL CAPACITY BY PRODUCTS

Products	ANNUAL CAPACITY (N. T.) Steel	Iron	Total
Rails—60 lbs. or less per yard	323,400		323,400
" —Over 60 lbs. per yard	2,383,600		2,383,600
Long joint or splice bars and tie plates	912,770		912,770
Structural shapes—Heavy	5,855,150		5,855,150
" —Light	912,360		912,360
Steel piling (Rolled)	282,300		282,300
Plates—Sheared	6,858,650		6,858,650
" —Universal	1,401,930		1,401,930
Sheets—Hot rolled	24,890,230		24,890,230
Strip—Hot rolled	4,907,550		4,907,550
Strip for cold reduced black plate and tin plate	4,694,530		4,694,530
Bars—Other than concrete reinforcement	11,935,310	42,500	11,977,810
" —Concrete reinforcement—New billet steel	1,254,560		1,254,560
" " " —Rerolled	403,500		403,500
Wire rods	6,360,350		6,360,350
Skelp	4,956,700	310,000	5,266,700
Blanks or pierced billets for seamless tubes	3,938,100		3,938,100
Wheels and axles (Rolled)	446,350		446,350
Ingots, blooms and billets for forging purposes	677,790		677,790
All other finished hot rolled	304,760		304,760
TOTAL	83,699,890	352,500	84,052,390
TOTAL STEEL INGOT CAPACITY	104,502,680		
PERCENT TO INGOT CAPACITY	80.1%		

Comparisons of hot-rolling capacity with steel ingot capacity, not including steel for castings, follow:

	Jan. 1, 1951	Jan. 1, 1948	Jan. 1, 1938
Steel Ingot Capacity (net tons)	104,147,810	93,922,340	79,593,404
Hot-Rolled Steel Capacity (net tons)	83,699,890	73,872,430	63,652,796
Per Cent to Ingot Capacity	80.4	78.7	80.0

Products processed cold are not included in the above figures, thus avoiding distortion of finished steel capacity figures for the industry as shown in the summary tables on this and the opposite page.

Rise in hot-rolling capacity was not universal among all products, however. In six categories there was a decline between 1948 and 1951. They are: Hot-rolled bars, other than concrete reinforcement bars; light structural shapes; heavy railroad rails; splice bars and tie plates; ingots, blooms and billets for forging; and miscellaneous hot-rolled products.

Biggest tonnage increase is in hot-rolled sheet capacity. That jumped from 18,947,570 net tons on Jan. 1, 1948, to 24,890,230 tons on Jan. 1, 1951. Hot-rolled strip capacity rose in the same period from 3,527,590 net tons to 4,907,550 tons. Those increases reflected the heavy demand for consumer goods and the trend toward the adoption of stampings wherever possible.

Capacity to produce strip for cold reduced black plate and tin plate also rose. It went from 4,114,300 net tons on Jan. 1, 1948, to 4,694,530 tons on Jan. 1, 1951.

The swing from hot-dipped tin plate to electrolytic tin plate as a means of conserving tin is reflected

FINISHED STEEL PRODUCT CAPACITIES BY COMPANIES

Structural Shapes, Rolled Steel Piling and Plates

	ANNUAL CAPACITY (N. T.) Structural Shapes (Heavy)	Rolled Steel Piling	Plates Sheared	Plates Universal
Companies:				
Alan Wood Steel Company			145,600	
Allegheny Ludlum Steel Corporation			6,000	
Armco Steel Corporation:				
Sheffield Steel Corporation	54,100		108,200	
Barium Steel Corporation:				
Central Iron and Steel Company			182,400	105,600
Phoenix Iron & Steel Company	259,000			
TOTAL	259,000		182,400	105,600
Bethlehem Steel Corporation:				
Bethlehem Steel Company	1,823,000	164,000	672,000	348,000
Bethlehem Pacific Coast Steel Corporation	98,000			12,000
TOTAL	1,921,000	164,000	672,000	360,000
Berg-Warner Corporation			25,000	
Byers Company, A. M.			30,000	70,000
Colorado Fuel and Iron Corporation	52,000		7,000	
Claymont Steel Corporation			300,000	
TOTAL	52,000		307,000	
Crucible Steel Company of America			42,000	12,000
Diaston & Sons, Inc., Henry			5,600	
Empire Steel Company				24,000
Granite City Steel Co.			120,000	
Inland Steel Company	250,000	5,000	385,000	85,000
International Harvester Company	22,000			60,000
Jessop Steel Company			9,000	
Jones & Laughlin Steel Corporation	110,000		140,800	
Kaiser Steel Corporation	60,000		216,000	25,000
Lukens Steel Company			486,000	
National Steel Corporation:				
Weirton Steel Company	(a) 200,000			
Republic Steel Corporation			(b)	60,000
Sharon Steel Corporation				
Simonds Saw and Steel Company			400	
United States Steel Corporation:				
Columbia Steel Company	8,900			
Geneva Steel Company	352,000		528,000	
Tennessee Coal, Iron and Railroad Co.	180,000		400,000	18,000
United States Steel Company	2,370,150	113,300	2,708,550	570,330
TOTAL	2,911,050	113,300	3,636,550	568,330
West Virginia Steel and Mfg. Co.	5,000			
Universal-Cyclops Steel Corporation			17,100	
Wheeling Steel Corporation			252,000	
Youngstown Sheet and Tube Company	11,000		72,000	12,000
GRAND TOTAL	5,855,150	282,300	6,858,650	1,401,930

(a) Includes steel piling and tie plates. (b) Included in hot rolled sheet capacity.

Ordinary and Chemically Treated Black Plate, Hot Dipped Tin and Terne Plate, and Electrolytic Tin Plate

	ANNUAL CAPACITY (N. T.)			
	Ordinary black plate	Chemically treated black plate	Hot dipped tin and terne plate	Electrolytic tin plate
Companies:				
Bethlehem Steel Corporation:				
Bethlehem Steel Company		154,000	648,000	540,000
Crown Cork & Seal Company, Inc.			32,400	144,000
Granite City Steel Company	12,000			75,000
Inland Steel Company			145,000	180,000
Jones & Laughlin Steel Corporation	77,000		109,200	193,200
National Steel Corporation:				
Weirton Steel Company	50,000		* 430,000	* 600,000
Republic Steel Corporation		20,000	160,000	140,000
United States Steel Corporation:				
Columbia Steel Company	9,160		162,450	101,410
Tennessee Coal, Iron and Railroad Co.		34,000	378,800	216,000
United States Steel Company	† 226,000		597,920	736,960
TOTAL	235,160	34,000	1,139,170	1,054,370
Wheeling Steel Corporation	150,000		315,000	110,000
Youngstown Sheet and Tube Company	30,000		222,000	216,000
GRAND TOTAL	554,160	208,000	3,200,770	3,252,570

* The combined capacity for hot dipped and electrolytic tin plate is limited to 960,000 tons.

† Includes capacity of chemically treated black plate.

in the institute's new directory. On Jan. 1, 1948, capacity to produce hot-dipped tin and terne plate exceeded electrolytic tin plate capacity, but by Jan. 1, 1951, electrolytic capacity was the leader. The 1948 tin plate capacities were: Hot-dipped, 3,714,150 net tons; electrolytic, 2,176,100 tons. The 1951 capacities are: Hot-dipped, 3,200,770 tons; electrolytic, 3,252,570 tons.

Growth in size of modern-day structures and the expansion of industrial plants under the defense program has brought about an increase in capacity for rolling heavy structural shapes. This capacity on Jan. 1, 1951, was 5,855,150 net tons, compared with 5,236,930 tons on Jan. 1, 1948. Meanwhile, capacity for rolling light structurals declined from 1,058,470 net tons to 912,360 tons.

Increase in demand for plates for national defense and defense-supporting programs has helped bring an increase in plate capacity. Sheared plate capacity on Jan. 1, 1951, was 6,858,650 net tons, compared with 5,811,400 tons on Jan. 1, 1948. Universal plate capacity on Jan. 1, 1951, was 1,401,930 net tons, compared with 1,371,300 tons three years earlier.

Reflecting the heavy demand for pipe for gas transmission lines and pipe and tubing for other industries, the capacity to produce steel skelp was boosted from 4,095,900 net tons on Jan. 1, 1948, to 4,956,700 tons on Jan. 1, 1951, and capacity for blanks or pierced billets for seamless tubes was raised from 3,285,040 net tons to 3,938,100 tons.

Interestingly, capacity to produce hot-rolled bars other than concrete reinforcement bars declined from 12,008,260 net tons on Jan. 1, 1948, to 11,935,310 tons on Jan. 1, 1951. Cold-finished bar capacity slid from 3,217,260 net tons to 2,968,395 tons.

The heavy demand in the last several years for consumer products brought about substantial increases in cold-rolling capacities. Cold-rolled sheet capacity on Jan. 1, 1951, was 11,498,330 net tons, compared with 8,758,845 tons three years earlier. Cold-rolled strip capacity climbed from 2,654,940 net tons to 2,825,840 tons.

Strip (Cold Rolled and Galvanized)

	ANNUAL CAPACITY (N. T.)	
	Cold rolled strip	Galvanized strip
Companies:		
Acme Steel Company	435,000	117,000
Allegheny Ludlum Steel Corporation	128,000	
Wallingford Steel Company	60,000	
TOTAL	188,000	
Alloy Metal Wire Company, Inc.	400	
American Shim Steel Company	18,000	
Atlantic Steel Company		13,000
Blair Strip Steel Company	36,000	
Buffalo Bolt Company	2,500	
California Cold Rolled Steel Corporation	24,000	
Carpenter Steel Company	8,500	
Cleveland Cold Rolling Mills Company	240	
Cold Metal Products Company	50,000	12,000
Crucible Steel Company of America	20,000	
Detroit Steel Corporation	222,000	
Disston & Sons, Inc., Henry	780	
Elco Steel Products Co.	36,000	
Elliott Brothers Steel Company	23,000	
Follansbee Steel Corporation	54,000	
Greer Steel Company	74,400	12,000
Griffin Manufacturing Company	36,000	
Hind Steel Company, Inc.	5,000	
Hofmann Industries Inc.	24,000	
Igoe Brothers Inc.	1,000	
Inland Steel Company	24,000	
Jones & Laughlin Steel Corporation	30,000	
Kaiser Steel Corporation	43,000	
McLouth Steel Corporation	92,400	
National Standard Company	6,000	
National Steel Corporation:		
Great Lakes Steel Corporation	50,000	
Weirton Steel Company	175,000	70,000
TOTAL	225,000	70,000
Newman-Crosby Steel Corporation	25,000	
Republic Steel Corporation	175,000	
Rhode Island Steel Corporation	3,000	
Roebling's Sons Company, John A.	28,000	10,000
Rome Strip Steel Company, Inc.	20,000	
Sharon Steel Corporation	108,000	45,000
Bramard Steel Company	25,000	15,000
Detroit Tube & Steel Company	80,000	
TOTAL	213,000	60,000
Simonds Saw & Steel Company	200	
Stanley Works	126,000	
Superior Steel Corporation	80,000	
Thomas Steel Company	120,000	36,000
Thompson Wire Company	60,000	
United States Steel Corporation:		
American Steel and Wire Company	238,820	36,810
Universal-Cyclops Steel Corporation	15,000	
Wallace Barnes Company	12,000	
Washburn Wire Company	23,100	
Worcester Pressed Steel Company	7,500	
GRAND TOTAL	2,825,840	366,810

Sheets (Cold Rolled, Galvanized, and Long Terne)

	ANNUAL CAPACITY (N. T.)		
	Cold rolled sheets	Galvanized sheets	Long terne sheets
Companies:			
Allegheny Ludlum Steel Corporation	15,000		
Armco Steel Corporation	1,096,000	359,000	48,000
Bethlehem Steel Corporation:			
Bethlehem Steel Company	1,440,000	228,000	
Continental Steel Corporation		110,000	
Crucible Steel Company of America	18,600		
Eastern Stainless Steel Corporation	18,000		
Empire Steel Corporation			16,000
Follansbee Steel Corporation	154,800		31,200
Ford Motor Company	485,000		
Granite City Steel Company	300,000	120,000	
Inland Steel Company	800,000	86,400	
Jones & Laughlin Steel Corporation	840,000		
National Steel Corporation:			
Great Lakes Steel Corporation	1,800,000		
Weirton Steel Company	750,000	220,000	30,000
TOTAL	2,550,000	220,000	30,000
Newport Steel Corporation		96,000	16,000
Parkersburg Steel Company		114,000	27,500
Reeves Steel and Manufacturing Company		42,000	
Republic Steel Corporation	1,170,000	440,000	
Sharon Steel Corporation:			
Niles Rolling Mill Company		51,600	15,600
Sheet Steel Mills, Inc.		55,000	
United States Steel Corporation:			
Columbia Steel Company	169,020	131,600	
Tennessee Coal, Iron and Railroad Co.		316,200	
United States Steel Company	1,355,910	367,660	65,800
TOTAL	1,524,930	815,460	65,800
Washington Steel Corporation	18,000		
Wheeling Steel Corporation	480,000	390,000	24,000
Whitney-Apollo Corporation		56,000	
Youngstown Sheet and Tube Company	588,000		
GRAND TOTAL	11,498,330	3,183,460	274,100

Hot Rolled Sheets

	Annual capacity (N. T.)
Companies:	
Alan Wood Steel Company	30,000
Allegheny Ludlum Steel Corporation	120,000
Armco Steel Corporation	1,984,000
Sheffield Steel Corporation	9,100
TOTAL	1,993,100
Bethlehem Steel Corporation:	
Bethlehem Steel Company	3,792,000
Borg-Warner Corporation	125,000
Continental Steel Corporation	130,000
Crucible Steel Company of America	42,200
Diuston & Sons Inc., Henry	10,500
Eastern Stainless Steel Corporation	18,000
Empire Steel Company	120,000
Ford Motor Company	975,000
Inland Steel Company	1,400,000
International Harvester Company	18,000
Jessop Steel Company	5,000
Jones & Laughlin Steel Corporation	1,524,400
Kaiser Steel Corporation	43,000
McLouth Steel Corporation	471,900
Mahoning Valley Steel Company	120,000
National Steel Corporation:	
Great Lakes Steel Corporation	2,260,000
Weirton Steel Company	(a) 2,075,000
TOTAL	4,335,000
Newport Steel Corporation	180,000
Parkersburg Steel Company	36,000
Superior Sheet Steel Division	140,060
TOTAL	176,060
Reeves Steel and Manufacturing Co.	75,000
Republic Steel Corporation	(b) 1,737,600
Sharon Steel Corporation:	
Niles Rolling Mill Company	150,000
Sheet Steel Mills, Inc.	55,000
Simonds Saw and Steel Company	4,000
United States Steel Corporation:	
Columbia Steel Company	317,040
Tennessee Coal, Iron and Railroad Co.	628,000
United States Steel Company	4,204,770
TOTAL	5,149,810
Universal-Cyclops Steel Corporation	13,100
Vanadium-Alloys Steel Company:	
Colonial Steel Company	1,120
Wheeling Steel Corporation	903,000
Whitney Apollo Corporation (The)	132,000
Youngstown Sheet and Tube Company	1,041,000
GRAND TOTAL	24,890,230

(a) Includes hot rolled strip.
(b) Includes plates.

Hot Rolled Strip

	Annual capacity (N. T.)
Companies:	
Acme Steel Company	545,000
Alan Wood Steel Company	216,000
Allegheny Ludlum Steel Corporation	150,000
Atlantic Steel Company	12,000
Boardi Steel Corporation	30,000
Borg-Warner Corporation	3,000
Buffalo Bolt Company	600
Byers Company, A. M.	60,000
Colorado Fuel and Iron Corporation	600
Connors Steel Company	21,600
Inland Steel Company	15,000
International Harvester Company	35,000
Kaiser Steel Corporation	62,000
Knoxville Iron Company	1,500
Laclede Steel Company	78,000
McLouth Steel Corporation	80,400
National Steel Corporation:	
Great Lakes Steel Corporation	375,000
Newport Steel Corporation	300,000
Republic Steel Corporation	474,000
Roebling's Sons Company (John A.)	12,000
Sharon Steel Corporation	585,000
Simonds Saw and Steel Company	780
Stanley Works	130,000
Superior Steel Corporation	115,000
United States Steel Corporation:	
American Steel and Wire Company	82,120
Columbia Steel Company	16,020
Geneva Steel Company	715,000
Tennessee Coal, Iron and Railroad Co.	58,100
United States Steel Company	638,630
TOTAL	1,509,870
Washburn Wire Company	61,200
Youngstown Sheet and Tube Company	12,000
GRAND TOTAL	4,907,550

Miscellaneous Finished Hot Rolled Products

	Annual capacity (N. T.)
Companies:	
American Locomotive Company	123,000
Baldwin-Lima-Hamilton Corporation	44,000
Colorado Fuel and Iron Corporation	30,800
Edgewater Steel Company	46,960
Midvale Company	60,000
TOTAL	304,760

Rails, Joint or Splice Bars and Tie Plates, Track Spikes and Wheels and Axles (Rolled)

	ANNUAL CAPACITY (N. T.)				
	Rails		Joint or splice bars and tie plates	Track spikes	Wheels and axles (Rolled)
	60 lbs. or less per yard	Standard (over 60 lbs. per yard)			
Companies:					
Ames & Company, Inc. W.				18,000	
Armco Steel Corporation					54,000
Sheffield Steel Corporation				24,000	
TOTAL				24,000	54,000
Baldwin-Lima-Hamilton Corporation					47,750
Bethlehem Steel Corporation:					
Bethlehem Steel Company	36,000	372,000	145,000	48,000	150,000
Bethlehem Pacific Coast Steel Corporation			12,000	6,000	
TOTAL	36,000	372,000	157,000	54,000	150,000
Colorado Fuel and Iron Corporation	9,600	420,000	144,000	30,000	
Edgewater Steel Company					35,000
Inland Steel Company		135,000	50,000	24,000	
Jones & Laughlin Steel Corporation				36,000	
National Steel Corporation:					
Weirton Steel Company			(a)	6,000	
Poor & Company			12,000		
Republic Steel Corporation				35,000	
Sweet's Steel Company	57,000		(b)		
Tredegar Company			20,000	10,000	
United States Steel Corporation:					
Columbia Steel Company			73,870		
Tennessee Coal, Iron and Railroad Co.	3,600	470,000	166,600	30,000	
United States Steel Company	132,200	986,600	279,300		159,600
TOTAL	135,800	1,456,600	519,770	30,000	159,600
West Virginia Steel and Manufacturing Co.	85,000		10,000		
Youngstown Sheet and Tube Company				28,800	
GRAND TOTAL	323,400	2,383,600	912,770	295,800	446,350

(a) Included in capacity of heavy structural shapes. (b) Included in capacity of hot rolled bars.

Pipe and Tubes

	ANNUAL CAPACITY (N. T.)								
	Buttweld	Lapweld	Seamless	Electric weld	Spiral weld	Gasweld	Galvanized	Pressure tubing	Mechanical tubing
Companies:									
Agaloy Tubing Company			800	200					1,000
Allegheny Ludlum Steel Corp.			1,800						
American Metal Products, Inc.				30,000					30,000
American Pipe & Steel Corp.						13,000			
Armco Steel Corporation				24,000	63,000				24,000
Babcock & Wilcox Tube Co.			143,000	39,400				67,200	115,200
Basalt Rock Company				358,000					
Bethlehem Steel Corporation:									
Bethlehem Steel Company	294,000	84,000					140,000		
Bundy Tubing Company				37,200				24,000	13,200
Byers Company, A. M.	47,000	90,000					84,000		
Central Steel Tube Co.				4,500					
Colorado Fuel & Iron Corp.:									
Claymont Steel Corp.				100,000					
Columbia Steel & Shafting Co.			15,000						
Electroweld Steel Corporation				7,000				2,000	5,000
Formed Tubes, Inc.				12,000					12,000
Fretz-Moon Tube Co., Inc.	60,000						30,000		
Globe Steel Tubes Company			72,000	1,800				24,000	49,800
Hofmann Industries, Inc.				600					600
Ivins Steel Tube Works, Inc.			1,300						
Jones & Laughlin Steel Corp.	190,000	120,000	420,000	45,000			84,000		55,000
Kaiser Steel Corp.	135,000			208,000			80,000		
Kane Boiler Works, Inc. E.				18,000					
Laclede Steel Company	60,000			24,000		5,000	35,000		30,000
Mark & Company, Clayton				24,000			8,400		24,000
Master Tank & Welding, Ltd.				100,000					
Mercer Tube & Mfg. Company	100,000						70,000		
Michigan Seamless Tube Co.			19,000						19,000
National Supply Company	222,000	45,000	336,000	6,000			93,000		10,000
Naylor Pipe Company					18,000				
Newport Steel Corporation				90,000					
Nikoh Tube Company				200,000					80,000
Ohio Seamless Tube Company			33,600	8,400					42,000
Pacific Tube Company			7,500	10,000				4,000	13,500
Pittsburgh Steel Company			360,000					72,000	60,000
Pittsburgh Tube Company	45,000			7,000					45,000
Republic Steel Corporation	250,000			767,000			120,000	61,000	84,000
Service Steel Company	2,000		1,500						
Sharon Steel Corporation:									
Branard Steel Company				64,800					
Sharon Tube Company	9,000								
Shenango Tube Company				16,000					16,000
Smith Corporation, A. O.				620,000					
Smith Corp. of Texas, A. O.				480,000					
Simmons Company	3,100								
South Chester Tube Company		108,000							
Southeastern Metals Co., Inc.				15,000					15,000
Southern Pipe & Casing Company				34,000					
Standard Tube Company				60,000					45,000
Superior Tube Company			1,500						
Taylor Forge & Pipe Works				12,000	72,000				
Timken Roller Bearing Company			210,000	15,000					210,000
Toledo Steel Tube Company									15,000
Trent Tube Company				2,000					
Tube Reducing Corporation			30,000						30,000
United States Steel Corporation:									
Chsolidated Western Steel Corp.				1,190,500					
National Tube Company	503,000		1,845,000	141,000			179,400	105,900	214,200
TOTAL	503,000		1,845,000	1,331,500			179,400	105,900	214,200
Vacuum Melt, Inc.			900						
Wheatland Tube Company	121,470			8,300			83,000		
Wheeling Steel Corporation	300,000						120,000		
Youngstown Sheet & Tube Co.	528,000		462,000	354,000			252,000		12,000
TOTAL	2,869,570	447,000	3,960,900	5,127,700	153,000	18,000	1,378,800	360,100	1,270,500

Hot Rolled Bars and Bar Size Shapes

	ANNUAL CAPACITY (N. T.)			
	Other than Concrete Reinforcement	Concrete Reinforcement		Bar Size Shapes
		New Billet	Rerolled	
Companies:				
Allegheny Ludlum Steel Corporation	34,800			
American Swedo Iron Corporation	12,000			
Ames & Company, W	35,000			(a)
Armco Steel Corporation	19,000			
Sheffield Steel Corporation	114,000	151,700	25,000	77,700
TOTAL	133,000	151,700	25,000	77,700
Atlantic Steel Company	20,000	20,000		18,000
Bethlehem Steel Corporation:				
Bethlehem Steel Company	1,462,000	300,000		168,000
Bethlehem Pacific Coast Steel Corporation	214,000	161,000		62,000
TOTAL	1,676,000	461,000		230,000
Board; Steel Corporation	40,000		10,000	(a)
Borg Warner Corporation	92,000	25,000	20,000	(a)
Braeburn Alloy Steel Corporation	3,200			
Buffalo Bolt Company	40,500			
Buffalo Steel Company	55,000	25,000		
Byers Company, A. M.	50,000			
Carpenter Steel Company	24,600			
Colorado Fuel and Iron Corporation	74,000	40,000		20,000
Columbia Tool Steel Company	1,800			
Connors Steel Company	7,400	10,000	55,000	
Copperweld Steel Company	320,000			
Crucible Steel Company of America	447,100			
Disston & Sons, Inc., Henry	22,400			
Falls Hollow Staybolt Company	8,000			
Firth Sterling Steel and Carbide Corporation	11,550			
Ford Motor Company	145,000			
Heller Brothers Company	18,000			
Highland Iron & Steel, Inc.	45,000			
Inland Steel Company	345,000	40,000	20,000	50,000
International Harvester Company	503,800			(a)
Jersey Shore Steel Company	30,000			(a)
Jessop Steel Company	6,000			
Jones & Laughlin Steel Corporation	485,000	2,000	10,000	50,000
Joslyn Manufacturing & Supply Company	15,000			1,000
Judson Steel Corporation	14,000	40,000		
Kaiser Steel Corporation	46,000			(a)
Knoxville Iron Company	51,500	23,100		13,900
Laclede Steel Company	24,000	6,000	107,000	24,000
Latrobe Electric Steel Company	5,500			
Lockhart Iron and Steel Company	60,000			(a)
Missouri Rolling Mill Corporation	16,500		53,500	
National Steel Corporation:				
Great Lakes Steel Corporation	60,000		12,000	3,000
Northern Steel, Inc.				
Northwest Steel Rolling Mills, Inc.	17,000	8,000		
Oregon Steel Mills	100,000			(a)
Pacific States Steel Corporation	85,000	30,000		40,000
Phoenix Manufacturing Company	15,000			
Pollak Steel Company	54,000		36,000	
Republic Steel Corporation	(b) 3,156,000	(a)		
Rotary Electric Steel Company	180,000			
Simmons Company	33,000		3,000	(a)
Simonds Saw and Steel Company	6,000			
Sweet's Steel Company	(c) 47,000		(a)	
Texas Steel Company	26,000		42,000	
Timken Roller Bearing Company	93,000			
Tredegar Company	22,000	5,000		
United States Steel Corporation:				
American Steel and Wire Company	102,500			
Columbia Steel Company	68,940	126,260		16,760
Tennessee Coal, Iron and Railroad Co.	158,400	67,400		(a)
United States Steel Company	2,452,200	168,100		331,000
TOTAL	2,782,040	361,760		347,760
Universal Cyclops Steel Corporation	15,400			
Vanadium Alloys Steel Company	6,000			
Colonial Steel Company	6,720			
TOTAL	12,720			
Vulcan Crucible Steel Company	3,000			
West Virginia Steel and Manufacturing Co.	10,000		10,000	20,000
Youngstown Sheet and Tube Company	342,000	6,000		17,000
GRAND TOTAL	11,977,810	1,254,560	403,500	912,360

(a) Included in capacity of bars—other than concrete reinforcement. (b) Includes concrete reinforcement bars and tube rounds.
(c) Includes splice bars, tie plates and rerolled concrete reinforcement bars.

Wire Rods

	Annual capacity (N. T.)
Companies:	
American Chain & Cable Company, Inc.	175,000
Armco Steel Corporation	18,800
Sheffield Steel Corporation	234,600
TOTAL	253,400
Atlantic Steel Company	55,000
Bethlehem Steel Corporation:	
Bethlehem Steel Company	731,000
Bethlehem Pacific Coast Steel Corporation	63,000
TOTAL	794,000
Buffalo Bolt Company	24,500
Colorado Fuel and Iron Corporation	364,000
Continental Steel Corporation	155,000
Copperweld Steel Company	55,000
Crucible Steel Company of America	14,800
Detroit Steel Corporation	180,000
Driver Company, Wilbur B.	6,000
International Harvester Company	2,500
Jones & Laughlin Steel Corporation	264,000
Joslyn Manufacturing & Supply Co.	2,000
Keystone Steel & Wire Company	282,000
Laclede Steel Company	89,000
Northwestern Steel & Wire Company	218,000
Pittsburgh Steel Company	310,000
Republic Steel Corporation	375,000
Roebling's Sons Company (John A.)	150,000
United States Steel Corporation:	
American Steel and Wire Company	1,997,020
Columbia Steel Company	219,230
Tennessee Coal, Iron and Railroad Co.	169,000
TOTAL	2,385,250
Universal Cyclops Steel Corporation	6,700
Washburn Wire Company	61,000
Workware Brothers, Inc.	35,000
Youngstown Sheet and Tube Company	103,200
GRAND TOTAL	6,360,350

Cold Finished Bars

	Annual capacity (N. T.)
Companies:	
Allegheny Ludlum Steel Corporation	*22,500
Anchor Drawn Steel Company	2,850
Armco Steel Corporation	34,600
Bethlehem Steel Company	53,000
Bliss & Laughlin, Inc.	354,000
Buffalo Bolt Company	3,200
Carpenter Steel Company	22,200
Columbia Steel & Shafting Company	136,000
Compressed Steel Shafting Company	20,000
Copperweld Steel Company	50,140
Crucible Steel Company of America	71,400
Cumberland Steel Company	40,000
Cuyahoga Steel & Wire Company	15,000
Firth Sterling Steel & Carbide Corporation	3,775
Fitzsimmons Steel Company	50,000
Fort Howard Steel & Wire	12,000
International Harvester Company	30,000
Jones & Laughlin Steel Corporation	420,000
Joslyn Manufacturing & Supply Company	28,000
Keystone Drawn Steel Company	32,600
Kidd Drawn Steel Company	5,000
La Salle Steel Company	248,000
Latrobe Electric Steel Company	1,000
Medart Company	4,000
Milltrop Steel Products Company	72,000
Monarch Steel Company, Inc.	40,000
Nelsen Steel & Wire Company	10,000
Pacific Tube Company	12,000
Pilgrim Drawn Steel Division	44,000
Pittsburgh Tool Steel Wire Company	6,500
Precision Drawn Steel Company	56,000
Republic Steel Corporation	400,000
Rotary Electric Steel Company	55,000
Sierra Drawn Steel Company	21,600
Superior Drawn Steel Company	36,000
Timken Roller Bearing Company	32,000
United States Steel Corporation:	
American Steel and Wire Company	56,030
Universal Cyclops Steel Company	7,350
Western Automatic Machine Screw Company	52,500
Wyckoff Steel Company	350,150
Youngstown Sheet and Tube Company	60,000
TOTAL	2,968,395

* Includes capacity of drawn wire.

Bolts, Nuts, Rivets and Washers

	Annual capacity (N. T.)
Companies:	
Ames & Company, Inc., W.	7,000
Armco Steel Corporation:	
Sheffield Steel Corporation	36,000
Atlantic Steel Company	5,580
Bethlehem Steel Corporation:	
Bethlehem Steel Company	78,000
Bethlehem Pacific Coast Steel Corporation	32,000
TOTAL	110,000
Buffalo Bolt Company	55,200
Colorado Fuel and Iron Corporation	*
Falls Hollow Staybolt Company	600
Igoe Brothers, Inc.	700
Republic Steel Corporation	112,000
United States Steel Corporation:	
Tennessee Coal, Iron and Railroad Co.	21,600
GRAND TOTAL	348,680

* Included in capacity of track spikes.

Skelp

	ANNUAL CAPACITY (N. T.)		
	Steel	Iron	Total
Companies:			
Armco Steel Corporation:			
Sheffield Steel Corporation	214,000		214,000
Bethlehem Steel Corporation:			
Bethlehem Steel Company	430,000		430,000
Borg Warner Corporation	10,000		10,000
Byers Company, A. M.		310,000	310,000
Jones & Laughlin Steel Corporation	440,000		440,000
Kaiser Steel Corporation	436,000		436,000
Laclede Steel Company	99,500		99,500
Republic Steel Corporation	1,163,000		1,163,000
United States Steel Corporation:			
National Tube Company	509,000		509,000
United States Steel Company	356,200		356,200
TOTAL	865,200		865,200
Wheeling Steel Corporation	411,000		411,000
Youngstown Sheet and Tube Company	888,000		888,000
GRAND TOTAL	4,956,700	310,000	5,266,700

Ingots, Blooms, Billets (Forging)

	Annual capacity (N. T.)
Companies:	
Alan Wood Steel Company	37,500
Allegheny Ludlum Steel Corporation	3,850
Armco Steel Corporation	2,140
Sheffield Steel Corporation	24,800
TOTAL	26,940
Bethlehem Steel Corporation:	
Bethlehem Steel Company	153,000
Colorado Fuel and Iron Corporation	500
Crucible Steel Company of America	22,000
Harrisburg Steel Corporation	75,000
Inland Steel Company	20,000
International Harvester Company	36,000
Timken Roller Bearing Company	20,000
United States Steel Corporation:	
Tennessee Coal, Iron and Railroad Co.	11,800
United States Steel Company	262,200
TOTAL	274,000
Youngstown Sheet and Tube Company	9,000
GRAND TOTAL	677,790

Blanks or Pierced Billets for Seamless Tubes

	Annual capacity (N. T.)
Companies:	
Babcock & Wilcox Tube Company	39,600
Crucible Steel Company of America	90,000
Inland Steel Company	5,000
Jones & Laughlin Steel Corporation	420,000
Pittsburgh Steel Company	350,000
Republic Steel Corporation	(a)
Timken Roller Bearing Company	216,500
United States Steel Corporation:	
National Tube Company	2,250,800
United States Steel Company	26,200
TOTAL	2,277,000
Youngstown Sheet and Tube Company	540,000
GRAND TOTAL	3,938,100

(a) Included in capacity of bars—other than concrete reinforcement.

Strip for Cold Reduced Black Plate and Tin Plate

	Annual capacity (N. T.)
Companies:	
Bethlehem Steel Corporation:	
Bethlehem Steel Company	1,000,000
Granite City Steel Company	370,000
Inland Steel Company	245,000
Jones & Laughlin Steel Corporation	440,000
National Steel Corporation:	
Weirton Steel Company	(a)
Republic Steel Corporation	250,000
United States Steel Corporation:	
Tennessee Coal, Iron and Railroad Co.	624,000
United States Steel Company	1,435,530
TOTAL	2,059,530
Youngstown Sheet and Tube Company	330,000
GRAND TOTAL	4,694,530

(a) Included in capacity of hot rolled sheets.

Wire and Wire Products

	ANNUAL CAPACITY (N. T.)					
	Plain wire	Galvanized wire	Nails and staples	Barbed wire	Woven fence	Bale ties
Companies:						
Alloy Metal Wire Company	3,500	.....	.....	.....	.....	.....
American Chain & Cable Co. Inc.	95,000	25,000	.....	600	.....	.....
Angell Nail & Chaplet Company	22,000	.....	18,000	.....	.....	.....
Armco Steel Corporation	18,000	.....	.....	.....	.....	.....
Sheffield Steel Corporation	238,000	68,000	63,100	24,000	30,500	10,000
TOTAL	256,000	68,000	63,100	24,000	30,500	10,000
Atlantic Steel Company	87,600	31,000	43,000	13,000	35,000	6,000
Atlantic Wire Company	26,000	3,500	.....	.....	.....	.....
Bethlehem Steel Corporation:						
Bethlehem Steel Company	563,000	132,000	85,000	22,000	18,000	15,000
Bethlehem Pacific Coast Steel Corp.	42,000	.....	.....	.....	.....	.....
TOTAL	605,000	132,000	85,000	22,000	18,000	15,000
Cedarburg Wire, Wire Nail & Screw Co.	.....	.....	1,350	.....	.....	.....
Buffalo Bolt Company	24,000	.....	.....	.....	.....	.....
Chicago Steel & Wire Company	23,000	2,500	.....	.....	.....	.....
Colorado Fuel & Iron Corporation	286,000	84,000	54,000	32,400	18,000	21,700
California Wire Cloth Corp.	43,200	.....	.....	3,700	.....	2,700
TOTAL	329,200	84,000	54,000	36,100	18,000	24,400
Continental Steel Corporation	155,000	60,000	51,000	31,000	54,000	15,000
Copperweld Steel Company	55,000	.....	.....	175	.....	.....
Crucible Steel Company of America	12,000	.....	.....	.....	.....	.....
Cuyahoga Steel & Wire Company	18,000	.....	.....	.....	.....	.....
Davis Wire & Cable Corp., K. H.	12,000	1,200	.....	.....	.....	600
Detroit Steel Corporation	144,000	12,000	21,600	.....	.....	.....
Driscoll Wire Company	12,000	600	.....	.....	.....	.....
Driver Company, Wilbur B.	2,000	.....	.....	.....	.....	.....
Ford Motor Company	52,000	.....	.....	.....	.....	.....
Igoe Brothers, Inc.	30,000	.....	2,500	.....	.....	.....
Jones & Laughlin Steel Corporation	250,000	68,400	66,000	36,000	14,400	.....
Joslyn Manufacturing & Supply Company	2,000	.....	.....	.....	.....	.....
Keystone Steel & Wire Company	261,000	145,000	49,000	39,000	237,000	.....
Mid States Steel & Wire Co.	100,000	50,000	12,500	18,000	29,500	6,000
TOTAL	361,000	195,000	61,500	57,000	266,500	6,000
Laclede Steel Company	90,000	10,000	.....	.....	.....	.....
Macwhyte Company	12,000	1,000	.....	.....	.....	.....
Madison Wire Company Inc.	8,700	2,000	.....	.....	.....	.....
National Standard Company	44,200	7,300	.....	.....	.....	.....
New England High Carbon Wire Company	11,000	.....	.....	.....	.....	.....
Nichols Wire & Aluminum Co.	65,700	13,500	15,450	16,500	15,000	11,100
Northwestern Steel & Wire Co.	252,000	170,000	40,800	26,400	38,000	32,400
Pittsburgh Steel Company	324,000	100,000	45,500	20,000	125,000	.....
Johnson Steel & Wire Co.	38,000	1,000	.....	.....	.....	.....
TOTAL	362,000	101,000	45,500	20,000	125,000	.....
Prentiss & Company, Geo. W.	5,000	.....	.....	.....	.....	.....
Republic Steel Corporation	348,000	105,000	113,000	35,000	41,000	13,000
Roebling's Sons Company, John A.	86,400	24,000	.....	.....	.....	.....
Seneca Wire & Mfg. Company	15,000	1,000	.....	.....	.....	.....
Sherman Steel & Wire Co.	1,500	.....	.....	.....	.....	.....
Spencer Wire Corporation	24,000	.....	.....	.....	.....	.....
Thompson Wire Company	12,000	.....	.....	.....	.....	.....
Union Wire Rope Corporation	35,000	5,000	.....	.....	.....	.....
United States Steel Corporation:						
American Steel & Wire Co.	1,690,520	525,580	349,960	182,690	221,220	24,790
Columbia Steel Company	123,950	27,230	53,870	4,190	7,660	3,450
Tennessee Coal, Iron and Railroad Company	170,600	75,100	87,700	28,000	81,700	7,400
TOTAL	1,985,070	627,910	491,530	214,880	310,580	35,640
Universal Cyclops Steel Corp.	6,000	.....	.....	.....	.....	.....
Washburn Wire Company	15,000	.....	.....	.....	.....	.....
Webb Wire Works	500	.....	.....	.....	.....	.....
Western Auto Machine Screw Co.	12,000	.....	.....	.....	.....	.....
Wickwire Brothers, Inc.	35,000	7,500	7,000	300	.....	.....
Wilson Steel & Wire Company	40,000	10,000	20,000	.....	.....	4,200
Wright Steel & Wire Co., G. F.	15,000	3,700	.....	.....	.....	.....
Youngstown Sheet & Tube Co.	72,000	15,000	.....	.....	.....	.....
GRAND TOTAL	6,129,370	1,787,110	1,200,330	532,955	965,980	173,340

Canadian Statistics

CANADA'S steel industry continues to expand too. Its annual capacity to produce steel for ingots and castings rose from 3,694,000 net tons on Jan. 1, 1948, to 4,009,500 tons on Jan. 1, 1951, an 8.5 per cent increase.

Just as was the case in the United States, the rise in steel producing capacity in Canada was accompanied by a decrease in the number of open hearths.

At the same time Canada's blast furnace capacity climbed from 2,718,000 net tons to 2,883,950 tons, with the number of furnaces remaining the same, 14. Coke-making capacity rose from 2,530,240 net tons to 2,736,400 tons; number of ovens climbed from 565 to 593.

Paralleling the trend in the United States, Canada's hot-rolling capacity increased more percentagewise

than ingot-making capacity. Hot-rolling capacity rose from 3,107,200 net tons to 3,416,800 tons, a 9.9 per cent expansion.

Capacities for some products declined while those for others increased. Biggest increases are for hot-rolled sheets and for strip for cold-reduced black plate and tin plate. Hot-rolled sheet capacity rose from 202,000 net tons to 333,000 tons, and capacity for strip for cold-reduced black plate and tin plate bounded from 200,000 net tons to 412,000 tons.

Capacity to produce sheared and universal plates dropped from 219,800 net tons to 195,400 tons, while capacity to roll heavy structurals eased off from 80,450 tons to 79,700 tons.

BLAST FURNACE CAPACITY

	PIG IRON		FERROALLOYS		Total annual capacity (N. T.)
	No. of stacks	Annual capacity (N. T.)	No. of stacks	Annual capacity (N. T.)	
Algoma Steel Corporation, Limited	5	1,035,000			1,035,000
Canadian Furnace Co., Limited	2	215,500	(a)	7,500	223,000
Dominion Foundries and Steel, Limited	1*	275,000			275,000
Dominion Steel & Coal Corporation, Ltd.	3	594,950			594,950
Steel Company of Canada, Limited	3	756,000			756,000
TOTAL	14	2,876,450	(a)	7,500	2,883,950

(a) Included under "Pig Iron."
* New blast furnace, construction will be completed mid year 1951.

COKE CAPACITY

	No. of ovens	Annual capacity (N. T.)
Algoma Steel Corporation, Limited	244	1,230,000
Dominion Foundries and Steel, Limited	35	225,000
Dominion Steel & Coal Corporation, Ltd.	173	431,400
Steel Company of Canada, Limited	141	850,000
TOTAL	593	2,736,400

STEEL INGOT CAPACITY

	OPEN HEARTH		BESSEMER		ELECTRIC		Total annual capacity (N. T.)
	No.	Annual capacity (N. T.)	No.	Annual capacity (N. T.)	No.	Annual capacity (N. T.)	
Kinds:							
Open hearth—Basic	46	3,305,000					3,305,000
Bessemer			(a)1				
Electric					20	704,500	704,500
TOTAL	46	3,305,000	1		20	704,500	4,009,500
Steel for castings included above		35,000				(b)	35,000
Companies:							
Algoma Steel Corporation, Ltd.	12	1,000,000	(a)1				1,000,000
Atlas Steels, Ltd.					6	200,000	200,000
Burlington Steel Company, Ltd.					1	15,000	15,000
Canadian Car & Foundry Company, Ltd.	3	35,000			2	(b)	35,000
Canadian Tube & Steel Products, Ltd.					3	100,000	100,000
Dominion Foundries and Steel, Ltd.	4	350,000			5	250,000	600,000
Dominion Steel & Coal Corp., Ltd.	10	685,000			1	28,000	713,000
Manitoba Rolling Mill Co., Ltd.	4	80,000			1	20,000	100,000
Steel Company of Canada, Ltd.	13	1,155,000			1	91,500	1,246,500
TOTAL	46	3,305,000	(a)1		20	704,500	4,009,500

(a) Used in melting charge for open hearth furnaces.
(b) Included in capacity shown for open hearth furnaces.

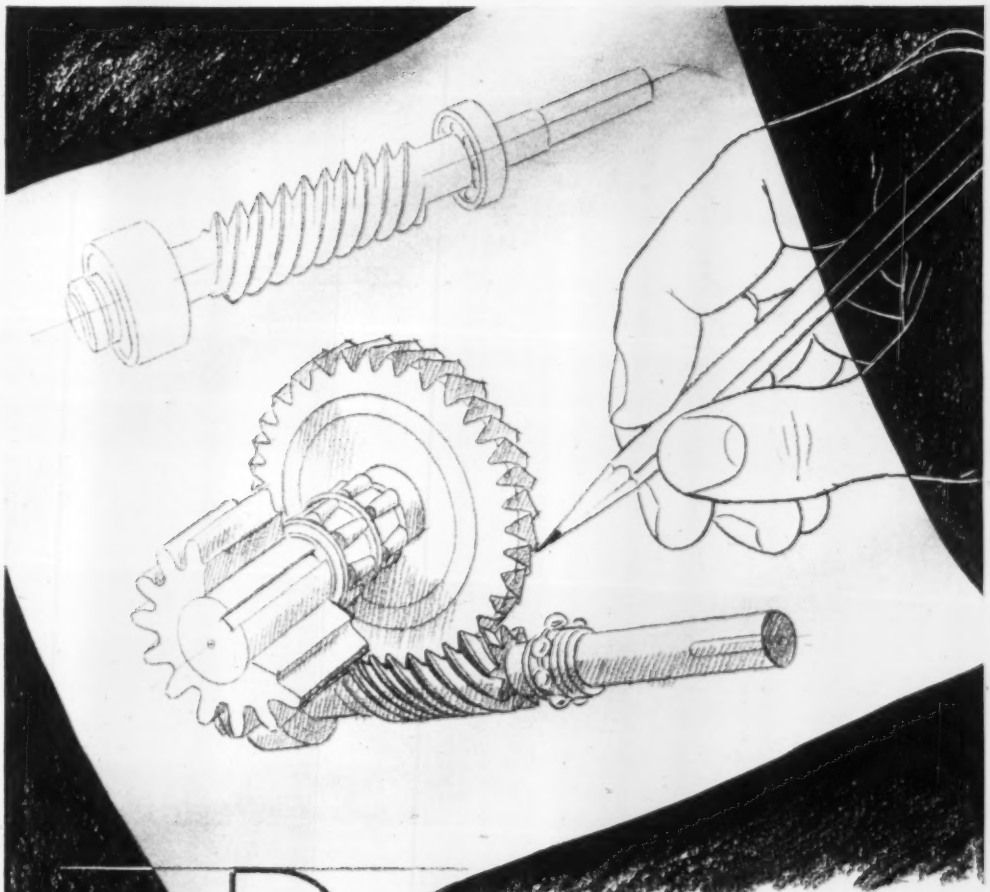
FINISHED STEEL PRODUCT CAPACITIES OF CANADIAN COMPANIES

	Annual capacity (N. T.)
Products:	
Rails—60 lbs. or less per yard	5,600
" —Over 60 lbs. per yard	451,300
Long joint or splice bars and tie plates	80,700
Structural shapes—Heavy	79,700
" —Light	127,100
Steel piling (Rolled)	16,000
Plates—Sheared	190,800
Plates—Universal	1,600
Sheets—Hot rolled	333,000
Skelp	58,000
Strip for cold reduced black plate and tin plate	412,000
Bars—Other than concrete reinforcement	790,000
" —Concrete reinforcement—New billet	72,000
" " " —Rerolled	21,000
Wire rods	299,000
Ingots, blooms and billets for forging purposes	158,500
All other finished hot rolled	317,500
TOTAL	3,416,800
Companies:	
Algoma Steel Corporation, Limited	755,700
Atlantic Industries Limited	22,000
Atlas Steels, Limited	206,000
Burlington Steel Company, Ltd.	44,500
Canadian Tube & Steel Products, Limited	172,000
Dominion Foundries and Steel, Limited	340,000
Dominion Steel & Coal Corporation, Ltd.	503,300
Manitoba Rolling Mill Company, Limited	62,300
Steel Company of Canada, Limited	1,276,000
Vancouver Rolling Mills, Ltd.	35,000
TOTAL	3,416,800
Rails—60 lbs. or less per yard:	
Algoma Steel Corporation, Limited	5,600
Rails—Over 60 lbs. per yard:	
Algoma Steel Corporation, Limited	171,300
Dominion Steel & Coal Corporation, Ltd.	280,000
TOTAL	451,300

	Annual capacity (N. T.)
Long Joint or Splice Bars and Tie Plates:	
Algoma Steel Corporation, Limited	13,500
Dominion Steel & Coal Corporation, Ltd.	25,200
Steel Company of Canada, Limited	42,000
TOTAL	80,700
Structural Shapes—Heavy:	
Algoma Steel Corporation, Limited	50,500
Atlantic Industries Limited	12,000
Manitoba Rolling Mill Company, Limited	6,200
Steel Company of Canada, Limited	11,000
TOTAL	79,700
Structural Shapes—Light:	
Algoma Steel Corporation, Limited	103,000
Manitoba Rolling Mill Company, Limited	6,100
Steel Company of Canada, Limited	18,000
TOTAL	127,100
Steel Piling (Rolled):	
Algoma Steel Corporation, Limited	16,000
Plates (Sheared and Universal):	
Algoma Steel Corporation, Limited	3,800
Dominion Foundries and Steel, Limited	90,000
Manitoba Rolling Mill Company, Limited	1,100
Steel Company of Canada, Limited	100,500
TOTAL	195,400
Sheets—Hot Rolled:	
Atlas Steels, Limited	6,000
Steel Company of Canada, Limited	327,000
TOTAL	333,000
Skelp:	
Steel Company of Canada, Limited	58,000
Strip for Cold Reduced Black Plate and Tin Plate:	
Dominion Foundries and Steel, Limited	250,000
Steel Company of Canada, Limited	162,000
TOTAL	412,000

	Annual capacity (N. T.)
Bars—Other than Concrete Reinforcement:	
Algoma Steel Corporation, Limited	24,000
Atlantic Industries Limited	10,000
Atlas Steels, Limited	152,000
Burlington Steel Company, Ltd.	21,000
Canadian Tube & Steel Products, Limited	152,000
Dominion Steel & Coal Corporation, Ltd.	61,600
Manitoba Rolling Mill Company, Limited	29,400
Steel Company of Canada, Limited	305,000
Vancouver Rolling Mills, Ltd.	35,000
TOTAL	790,000
Bars—Concrete Reinforcement:	
Algoma Steel Corporation, Limited	16,000
Burlington Steel Company, Ltd.	21,000
Canadian Tube & Steel Products, Limited	20,000
Manitoba Rolling Mill Company, Limited	19,500
Steel Company of Canada, Limited	16,500
TOTAL	93,000
Wire Rods:	
Atlas Steels, Limited	24,000
Dominion Steel & Coal Corporation, Ltd.	112,000
Steel Company of Canada, Limited	163,000
TOTAL	299,000
Ingots, Blooms and Billets for Forging Purposes:	
Algoma Steel Corporation, Limited	110,000
Atlas Steels, Limited	24,000
Dominion Steel & Coal Corporation, Ltd.	24,500
TOTAL	158,500
Miscellaneous Finished Hot Rolled Products:	
Algoma Steel Corporation, Limited	242,000
Burlington Steel Company, Ltd.	2,500
Steel Company of Canada, Limited	73,000
TOTAL	317,500

(The foregoing statistics were compiled by the American Iron & Steel Institute and published with its permission)



Design

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- These men well know BRAD FOOTE's creed—*"No one shares our responsibility."*
- They know the gears they design—for use in your shop or on the equipment you sell to others—will bear a proud brand name—BRAD FOOTE. So, our designers start your order on its journey through our plant . . . and through a system of complete control which assures satisfactory performance of the gears you buy.

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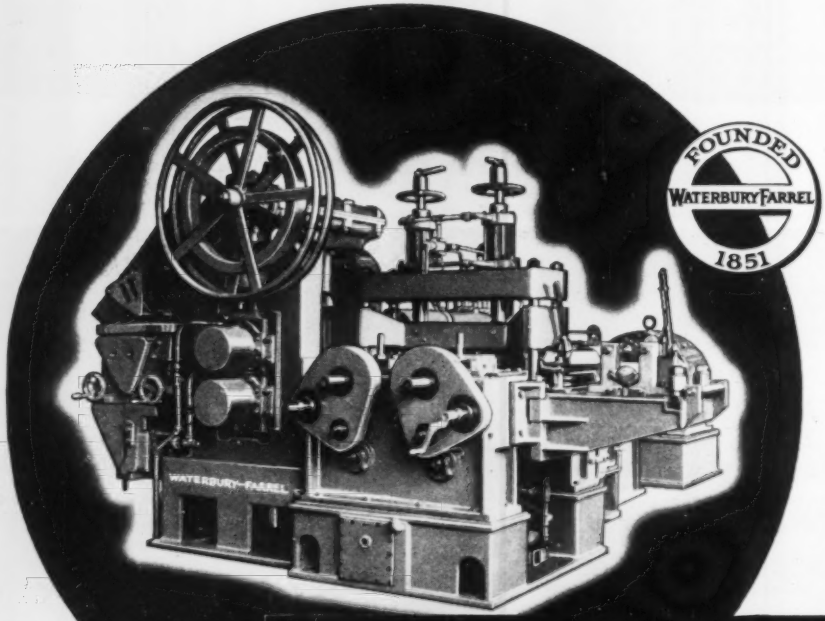

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Variable Speeds up to 360 feet per minute, or more

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If your problem is Mill Equipment for light gage steel or for non-ferrous materials, be it

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The Market Outlook

STEELMAKERS enter the closing quarter of the year burdened wth far more orders than they can handle expeditiously. Arrearages from third quarter are substantial, and the defense load, sustained at high level, gives signs of increasing as projected work reaches active stage. In the circumstances, lacking sizable order cancellations, there is little possibility demand-supply balance can be achieved in the months immediately ahead.

SUPPLY— There has been some loosening of reserve steel supplies held for emergency work in fourth quarter. Tonnage is relatively small, however, including structural shapes, plates and bars. Meanwhile, outright order cancellations to date are negligible despite government control authorities' efforts to eliminate duplicate tonnage from mill order books. Only in a few specialties, tool steel, wire rope, enameling sheets and heavy forgings, has any noticeable lag appeared. In some products, galvanized sheets for example, supply conditions are more stringent than ever. Further, rail inquiry for 1952 is appearing, the Pennsylvania railroad closing bids on 100,000 tons this week, up from 78,000 tons in 1951.

BOOKINGS— Most steel producers are declining orders for shipment beyond first quarter 1952, except in the case of defense requirements. On the latter account business is being accepted by some interests into third quarter on a limited scale. As a general thing the steelmakers are booking with extreme caution even for first quarter. Setting up of rolling schedules under the Controlled Materials Plan is more orderly than at the beginning of third quarter.

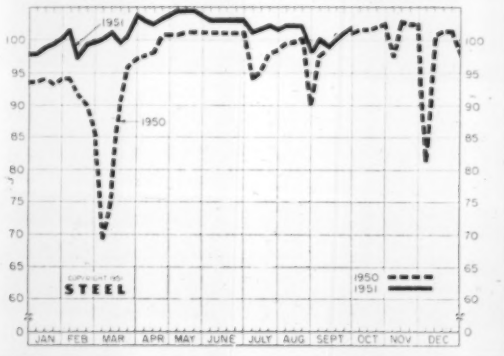
STRUCTURALS— Some shape tonnage held in reserve at mills for emergency fourth-quarter construction is being released. Whether the tonnage will materially relieve the acute supply stringency expected before yearend by some fabricating shops is questionable. Measured by ordinary standards the released tonnage is modest. Shortage in structurals is likely to continue well through 1952. First-quarter tonnage requests are running 200 per cent of available supply with peak demand expected in second or third quarter. Channeling of structurals, it is understood, will be first, for military programs, second, for important machine tool expansion, third, for aluminum and nickel expansion, fourth, for steel plant expansion, and fifth, miscellaneous construction.

WAREHOUSE— While not yet in receipt of the official text of the amended NPA order, distributors are being advised their steel quotas will be stepped up to 100 per cent of their base period receipts in carbon and alloy steels, effective Jan. 1. Currently, they are receiving 85 per cent of receipts in the base period, first nine months of 1950. The new quota is minimum, the mills being permitted to sell still larger tonnage to the warehouses should they have any to spare. Provision also is understood made to care for requirements of new warehouses that have little or no tonnage in the way of base period activity. Extent to which the warehouses will be helped by the increase in quotas is uncertain. Minimum quotas to date have actually worked out to be ceilings in practice, so the distributors are not counting too heavily on extra tonnage yet.

PRODUCTION— Steel operations are being pressed at above-capacity pace, last week the national ingot rate rising ½ point to 101.5 per cent of capacity. However, the mills are beginning to show wear-and-tear from the prolonged period of high level production. Shutdowns for repairs are more frequent. Meanwhile, steel expansion programs are being pushed to completion as rapidly as possible. For instance, despite structural steel cutbacks, first unit of the new Fairless Works, United States Steel Co. at Morrisville, Pa., the tin plate mill, is expected to come into production on schedule around Jan. 1.

PRICES— Steel and related product prices are holding at the government freeze levels. STEEL's weighted index on finished steel is unchanged at 171.92.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended Sept. 29	Change	Same Week 1950	Same Week 1949
Pittsburgh	98.5	— 0.5	101	81.5
Chicago	105.5	+ 0.5	103	91
Mid-Atlantic	100	0	99	80
Youngstown	106	+ 1	106	94
Wheeling	96.5	— 0.5	98	91.5
Cleveland	97.5	— 3*	100	102.5
Buffalo	104	0	104	79.5
Birmingham	102	+ 12	100	100
New England	93	+ 11	82	71
Cincinnati	103	+ 3	103	92
St. Louis	86.5	— 6.5	92	84.5
Detroit	107	+ 1	106	52
Western	102	— 1	105	77
Estimated national rate	101.5	+ 0.5	101	85

Based on weekly steelmaking capacity of 1,999,034 tons for 1951; 1,928,721 tons for second half, 1950; 1,906,268 tons for first half, 1950; 1,843,516 tons for 1949.

* Change from revised rate for preceding week.

The Metalworking Outlook—p. 27 Production-Engineering News—p. 63

Composite Market Averages

FINISHED STEEL INDEX, Weighted:

	Sept. 27 1951	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av. = 100)	171.92	171.92	171.92	156.99	112.04
Index in cents per lb.	4.657	4.657	4.657	4.253	3.035

ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$106.32	$106.32	$106.32	$94.50	$64.45
No. 2 Fdry. Pig Iron, GT	52.54	52.54	52.54	48.84	28.17
Basic Pig Iron, GT	52.16	52.16	52.16	47.72	27.50
Malleable Pig Iron, GT	53.27	53.27	53.27	49.13	28.79
Steelmaking scrap, GT	44.00	44.00	44.00	41.00	19.17

Weighted finished steel index based on average shipments and Pittsburgh district prices of the following 14 respresentative products during 5-Year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown, Malleable composite based on same points except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Sept. 27 Pgh.	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	3.70	3.70	3.70	3.45	2.50
Bars, H.R., Chicago	3.70	3.70	3.70	3.45	2.50
Bars, H.R., del. Philadelphia	4.223	4.223	4.223	3.93	2.86
Bars, C.F., Pittsburgh	4.55	4.55	4.55	4.10-15	3.10
Shapes, Std., Pittsburgh	3.65	3.65	3.65	3.40	2.35
Shapes, Std., Chicago	3.65	3.65	3.65	3.40	2.35
Shapes, del. Philadelphia	3.918	3.918	3.918	3.46	2.48
Plates, Pittsburgh	3.70	3.70	3.70	3.50	2.50
Plates, Chicago	3.70	3.70	3.70	3.50	2.50
Plates, Coatesville, Pa.	4.15	4.15	4.15	3.90	2.50
Plates, Sparrows Point, Md.	3.70	3.70	3.70	3.50	2.50
Plates, Claymont, Del.	4.15	4.15	4.15	3.90	2.50
Sheets, H.R., Pittsburgh	3.60-75	3.60-75	3.60-75	3.35	2.425
Sheets, H.R., Chicago	3.60	3.60	3.60	3.35	2.425
Sheets, C.R., Pittsburgh	4.35	4.35	4.35	4.10	3.275
Sheets, C.R., Chicago	4.35	4.35	4.35	4.10	3.275
Sheets, C.R., Detroit	4.55	4.55	4.55	4.30	3.375
Sheets, Galv., Pittsburgh	4.80	4.80	4.80	4.40	4.05
Strip, H.R., Pittsburgh	3.75-4.00	3.75-4.00	3.75-4.00	3.50	2.35
Strip, H.R., Chicago	3.50	3.50	3.50	3.25	2.35
Strip, C.R., Pittsburgh	4.65-5.35	4.65-5.35	4.65-5.35	4.15-50	3.05
Strip, C.R., Chicago	4.90	4.90	4.90	4.30	3.15
Strip, C.R., Detroit	4.85-5.60	4.85-5.60	4.85-5.60	4.35-95	3.15
Wire, Basic, Pittsburgh	4.85-5.10	4.85-5.10	4.85-5.10	4.50	3.05
Nails, Wire, Pittsburgh	5.90-6.20	5.90-6.20	5.90-6.20	5.30	3.75
Tin plate, box, Pittsburgh	$8.70	$8.70	$8.70	$7.50	$5.25

SEMIFINISHED

Billets, forging, Pitts. (NT)	$66.00	$66.00	$66.00	$63.00	$47.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$", Pitts.	4.10-30	4.10-30	4.10-30	3.85	2.50

PIG IRON, Gross Ton

Bessemer, Pitts.	$53.00	$53.00	$53.00	$47.50	$29.00
Basic, Valley	52.00	52.00	52.00	46.49	28.00
Basic, del. Phila.	56.61	56.61	56.61	50.39	29.93
No. 2 Fdry, Pitts.	52.50	52.50	52.50	49.50	28.50
No. 2 Fdry, Chicago	52.50	52.50	52.50	46.50-49.50	28.50
No. 2 Fdry, Valley	52.50	52.50	52.50	49.50	28.50
No. 2 Fdry, Del. Phila.	57.11	57.11	57.11	50.89	30.43
No. 2 Fdry, Birm.	48.88	48.88	48.88	45.88	24.88
No. 2 Fdry, Birm., del. Cin.	55.49	55.49	55.49	52.58	28.94
Malleable Valley	52.50	52.50	52.50	49.50	28.50
Malleable, Chicago	52.50	52.50	52.50	46.50-49.50	28.50
Charcoal, Lyles, Tenn.	66.00	66.00	66.00	60.00	33.00
Ferromanganese, Etna, Pa.	188.00	188.00	188.00	175.00	140.00*

* Delivered, Pittsburgh.

SCRAP, Gross Ton (including broker's commission)

No. 1 Heavy Melt, Pitts.	$45.00	$45.00	$45.00	$44.00	$20.00
No. 1 Heavy Melt, E. Pa.	43.50	43.50	43.50	39.00	18.75
No. 1 Heavy Melt, Chicago	43.50	43.50	43.50	40.00	18.75
No. 1 Heavy Melt, Valley	45.00	45.00	45.00	43.75	20.00
No. 1 Heavy Melt, Cleve.	44.00	44.00	44.00	43.25	19.50
No. 1 Heavy Melt, Buffalo	44.00	44.00	44.00	41.50	19.25
Rails, Rerolling, Chicago	52.50	52.50	52.50	61.00	22.25
No. 1 Cast, Chicago	49.00*	49.00*	49.00*	50.50	20.00

* F.o.b. shipping point.

COKE, Net Ton

Beehive, Furn. Connlsvl.	$14.75	$14.75	$14.75	$14.25	$8.75
Beehive, Fdry. Connlsvl.	17.50	17.50	17.50	16.50	9.50
Oven, Fdry., Chicago	23.00	23.00	23.00	21.00	14.35

NONFERROUS METALS

Copper, del. Conn.	24.50	24.50	24.50	22.50-24.50	14.375
Zinc, E. St. Louis	17.50	17.50	17.50	17.50	8.25
Lead, St. Louis	16.80	16.80	16.80	15.80	8.10
Tin, New York	103.00	103.00	103.00	103.00	52.00
Aluminum, del.	19.00	19.00	19.00	17.50-19.00	15.00
Antimony, Laredo, Tex.	42.00	42.00	42.00	32.00	14.50
Nickel, refinery, duty paid	56.50	56.50	56.50	48.00	35.00

PIG IRON

F.o.b. furnace prices quoted under GCPR as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax. Key to producing companies published on second following page.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa., B2	$54.00	$54.50	$55.00	$55.50
Brooklyn, N.Y., del.	....	59.18	59.68	....
Newark, del.	56.87	57.37	57.87	58.37
Philadelphia, del.	56.61	57.11	57.61	58.11
Birmingham District				
Alabama City, Ala., R2	48.38	48.88	....	....
Birmingham, R2	48.38	48.88	....	....
Birmingham, S8	48.38	48.88	....	....
Woodward, Ala., W15	48.38	48.88	....	....
Cincinnati, del.	....	55.49	....	....
Buffalo District				
Buffalo, R2	52.00	52.50	53.00	....
Buffalo, H1	52.00	52.50	53.00	....
Tonawanda, N.Y., W12	52.00	52.50	53.00	....
No. Tonawanda, N.Y., T9	....	52.50	53.00	....
Boston, del.	62.11	62.61	63.11	....
Rochester, N.Y., del.	54.88‡	55.38‡	55.88‡	....
Syracuse, N.Y., del.	55.91‡	56.41‡	56.91‡	....
Chicago District				
Chicago, I-3	52.00	52.50	52.50	53.00
Gary, Ind., U5	52.00	....	52.50	....
Indiana Harbor, Ind., I-2	52.00	....	52.50	....
So. Chicago, Ill., W14	52.00	52.50	52.50	....
So. Chicago, Ill., Y1	52.00	52.50	52.50	....
So. Chicago, Ill., U5	52.00	....	52.50	53.00
Milwaukee, del.	54.06	54.56	54.56	55.06
Muskegon, Mich., del.	....	58.47	58.47	....
Cleveland District				
Cleveland, A7	52.00	52.50	52.50	53.00
Cleveland, R2	52.00	52.50	52.50	....
Akron, O., del. from Cleve.	54.61	55.11	55.11	55.61
Lorain, O., N3	52.00	....	....	53.00
Duluth, I-3	....	....	52.50	....
Erie, Pa., I-3	52.00	52.50	52.50	53.00
Everett, Mass., E1	....	55.25	55.75	....
Fontana, Calif., K1	58.00	58.50	....	....
Geneva, Utah, G1	52.00	52.50	....	....
Seattle, Tacoma, Wash., del.	....	60.66	....	....
Portland, Oreg., del.	....	60.66	....	....
Los Angeles, San Francisco, del.	60.16	60.66	....	....
Granite City, Ill., G1	53.00	54.40	54.90	....
St. Louis, del. (inc. 3X8)	54.66	55.16	55.66	....
Ironton, Utah, C11	52.00	52.50	....	....
Lone Star, Tex., L6	48.00	*48.50	48.50	....
Minnequa, Colo., C10	54.00	55.00	55.00	....
Pittsburgh District				
Neville Island, Pa., P6	....	52.50	52.50	53.00
Pitts., N.&S. sides, Ambridge, Aliquippa, del.	....	53.80	53.80	54.30
McKees Rocks, del.	....	53.54	53.54	54.04
Lawrenceville, Homestead, McKeesport, Monaca, del.	....	54.07	54.07	54.57
Verona, del.	....	54.57	54.57	55.07
Brackenridge, del.	....	54.82	54.82	55.32
Bessemer, Pa., U5	52.00	....	52.50	53.00
Clairton, Rankin, So. Duquesne, Pa., U5	52.00	....	....	....
McKeesport, Pa., N3	52.00	....	....	53.00
Monessen, Pa., P7	54.00	....	....	....
Sharpsville, Pa., S6	....	....	52.50	53.00
Steelton, Pa., B2	54.00	54.50	55.00	55.50
Swedeland, Pa., A3	56.00	56.50	57.00	57.50
Toledo, O., I-3	52.00	52.50	52.50	53.00
Cincinnati, del.	57.47	57.97	....	....
Troy, N.Y., R2	54.00	54.50	55.00	55.50
Youngstown District				
Hubbard, O., Y1	52.00	52.50	52.50	....
Youngstown, Y1	52.00	52.50	52.50	....
Youngstown, U3	52.00	....	....	53.00
Mansfield, O., del.	56.65	57.15	57.15	57.65

* Low phos, southern grade. ‡ Preliminary.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%; except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY IRON, Gross Ton

(Base 6.00/6.50% silicon; add $1.50 for each 0.5% Si)

Jackson, O., G2, J1	$62.50
Buffalo, H1	63.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for each 0.045% max. P)

Niagara Falls, N.Y., P15	$88.00
Keokuk, Iowa, Openhearth & Fdry., frt. allowed K2	92.50
Keokuk, OH & Fdry., 12½ lb piglets, 16% Si, frt. allowed K2	95.50
Wenatchee, Wash., O.H. & Fdry., frt. allowed K2	92.50

CHARCOAL PIG IRON, Gross Ton

(Low phos semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles, Tenn., T3	$66.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$57.00
Steelton, Pa., B2	60.00
Philadelphia delivered	63.37
Troy, N.Y., R2	60.00

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Semifinished and Finished Steel Products

Mill prices quoted under GCPR as reported to STEEL, Sept. 27, 1951; cents per pound except as otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company; key on next two pages.

INGOTS, Carbon, Forging (NT)
Fontana,Calif. K1 ..... $79.00
Munhall,Pa. U5 ..... 52.00

INGOTS, Alloy (NT)
Detroit R7 ..... $54.00
Fontana,Calif. K1 ..... 80.00
Houston,Tex. S5 ..... 62.00
Midland,Pa. C18 ..... 54.00
Munhall,Pa. U5 ..... 54.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ..... $56.00
Clairton,Pa. U5 ..... 56.00
Ensley,Ala. T2 ..... 56.00
Fairfield,Ala. T2 ..... 56.00
Fontana,Calif. K1 ..... 75.00
Gary,Ind. U5 ..... 56.00
Johnstown,Pa. B2 ..... 56.00
Lackawanna,N.Y., B2 .. 56.00
Munhall,Pa. U5 ..... 56.00
So.Chicago,Ill. U5 ..... 56.00
So.Duquesne,Pa. U5 ..... 56.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ..... $66.00
Buffalo R2 ..... 66.00
Canton,O. R2 ..... 66.00
Clairton,Pa. U5 ..... 66.00
Cleveland R2 ..... 66.00
Conshohocken,Pa. A3 .. 73.00
Detroit R7 ..... 69.00
Ensley,Ala. T2 ..... 66.00
Fairfield,Ala. T2 ..... 66.00
Fontana,Calif. K1 ..... 85.00
Gary,Ind. U5 ..... 66.00
Geneva,Utah G1 ..... 66.00
Houston,Tex. S5 ..... 74.00
Johnstown,Pa. B2 ..... 66.00
Lackawanna,N.Y. B2 .. 66.00
LosAngeles B3 ..... 85.00
Munhall,Pa. U5 ..... 66.00
Seattle B3 ..... 85.00
So.Chicago R2,U5,W14 .. 66.00
So.Duquesne,Pa. U5 .. 66.00
So.SanFrancisco B3 .. 85.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..... $70.00
Buffalo R2 ..... 70.00
Canton,O. R2 ..... 70.00
Canton,O.(29) T7 ..... 66.00
Conshohocken,Pa. A3 .. 77.00
Detroit R7 ..... 73.00
Fontana,Calif. K1 ..... 89.00
Gary,Ind. U5 ..... 70.00
Houston,Tex. S5 ..... 78.00
Ind.Harbor,Ind. Y1 .. 70.00
Johnstown,Pa. B2 ..... 70.00
Lackawanna,N.Y. B2 .. 70.00
LosAngeles B3 ..... 90.00
Massillon,O. R2 ..... 70.00
Midland,Pa. C18 ..... 70.00
Munhall,Pa. U5 ..... 70.00
So.Chicago R2,U5,W14 .. 70.00
So.Duquesne,Pa. U5 .. 70.00
Struthers,O. Y1 ..... 70.00
Warren,O. C17 ..... 70.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 ..... $82.00
Cleveland R2 ..... 82.00
Fontana,Calif. K1 ..... 103.00
Gary,Ind. U5 ..... 82.00
Massillon,O. R2 ..... 82.00
So.Chicago, Ill. R2 ..... 82.00
So.Duquesne,Pa. U5 ..... 82.00

SHEET BARS (NT)
Fontana,Calif. K1 ..... $80.00

SKELP
Aliquippa,Pa. J5 ..... $3.45
Munhall,Pa. U5 ..... 3.35
Warren,O. R2 ..... 3.35
Youngstown, R2, U5 ..... 3.35

WIRE RODS
Alton,Ill. L1 ..... 4.40
AlabamaCity,Ala. R2 ..... 4.10
Buffalo W12 ..... 4.10
Cleveland A7 ..... 4.10
Donora,Pa. A7 ..... 4.10
Fairfield,Ala. T2 ..... 4.10
Fontana,Calif. K1 ..... 4.90
Houston, Tex. S5 ..... 4.50
Johnstown,Pa. B2 ..... 4.10
Joliet,Ill. A7 ..... 4.10
LosAngeles B3 ..... 4.90
Minnequa,Colo. C10 ..... 4.35
Monessen,Pa. P7 ..... 4.30
No.Tonawanda,N.Y. B11 .. 4.10
Pittsburg,Calif. C11 ..... 4.75
Portsmouth,O. P12 ..... 4.30
Roebling,N.J. R5 ..... 4.20
So.Chicago,Ill. R2 ..... 4.10
SparrowsPoint,Md. B2 .. 4.20
Sterling,Ill.(1) N15 ..... 4.10
Struthers,O. Y1 ..... 4.10
Torrance,Calif. C11 ..... 4.90
Worcester,Mass. A7 ..... 4.40

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 ..... 4.45
Lackawanna,N.Y. B2 ..... 4.45
Munhall,Pa. U5 ..... 4.45
So.Chicago,Ill. U5 ..... 4.45

STRUCTURALS
Carbon Steel Stand. Shapes
AlabamaCity,Ala. R2 ..... 3.60
Aliquippa,Pa. J5 ..... 3.65
Bessemer,Ala. T2 ..... 3.65
Bethlehem,Pa. B2 ..... 3.70
Clairton,Pa. U5 ..... 3.65
Fairfield,Ala. T2 ..... 3.65
Fontana,Calif. K1 ..... 4.25
Gary,Ind. U5 ..... 3.65
Geneva,Utah G1 ..... 3.65
Houston,Tex. S5 ..... 4.05
Ind.Harbor,Ind. I-2 ..... 3.65
Johnstown,Pa. B2 ..... 3.70
KansasCity,Mo. S5 ..... 4.25
Lackawanna,N.Y. B2 ..... 3.70
LosAngeles B3 ..... 4.25
Minnequa,Colo. C10 ..... 4.10
Munhall,Pa. U5 ..... 3.65
Niles,Calif.(22) P1 ..... 4.85
Phoenixville,Pa. P4 ..... 6.25
Portland,Oreg. O4 ..... 4.50
Seattle B3 ..... 4.30
So.Chicago,Ill. U5,W14 .. 3.65
So.SanFrancisco B3 ..... 4.20
Torrance,Calif. C11 ..... 4.25
Weirton,W.Va. W6 ..... 3.90

Alloy Stand. Shapes
Clairton,Pa. U5 ..... 4.35
Fontana,Calif. K1 ..... 5.55
Munhall,Pa. U5 ..... 4.35
So.Chicago,Ill. U5 ..... 4.35

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 ..... 5.50
Bessemer,Ala. T2 ..... 5.50
Bethlehem,Pa.(14) B2 ..... 5.50
Clairton,Pa. U5 ..... 5.50
Fairfield,Ala. T2 ..... 5.50
Fontana,Calif. K1 ..... 6.10
Gary,Ind. U5 ..... 5.50
Geneva,Utah G1 ..... 5.50
Ind.Harbor,Ind. I-2 ..... 5.50
Ind.Harbor,Ind. Y1 ..... 6.00
Johnstown,Pa. B2 ..... 5.50
Lackawanna,N.Y.(14) B2 .. 5.50
LosAngeles B3 ..... 6.05
Munhall,Pa. U5 ..... 5.50
Seattle B3 ..... 6.10
So.Chicago,Ill. U5 ..... 5.50
So.SanFrancisco B3 ..... 6.00
Struthers,O. Y1 ..... 6.00

Wide Flange
Bethlehem,Pa. B2 ..... 3.70
Clairton,Pa. U5 ..... 3.65
Fontana,Calif. K1 ..... 4.65
Lackawanna,N.Y. B2 ..... 3.70
Munhall,Pa. U5 ..... 3.65
So.Chicago,Ill. U5 ..... 3.65

H.S., L.A. Wide Flange
Bethelehem,Pa. B2 ..... 5.50
Lackawanna,N.Y. B2 ..... 5.50
Munhall,Pa. U5 ..... 5.45
So.Chicago,Ill. U5 ..... 5.45

BEARING PILES
Munhall,Pa. U5 ..... 3.65
So.Chicago,Ill. U5 ..... 3.65

PLATES, High-Strength Low-Alloy
Aliquippa,Pa. J5 ..... 5.65
Bessemer,Ala. T2 ..... 5.65
Clairton,Pa. U5 ..... 5.65
Cleveland J5, R2 ..... 5.65
Conshohocken,Pa. A3 ..... 5.90
Fairfield,Ala. T2 ..... 5.65
Fontana,Calif.(30) K1 ..... 6.25
Gary,Ind. U5 ..... 5.65
Geneva,Utah G1 ..... 5.65
Ind.Harbor,Ind. I-2 ..... 5.65
Ind.Harbor,Ind. Y1 ..... 6.15
Johnstown,Pa. B2 ..... 5.65
Munhall,Pa. U5 ..... 5.65
Pittsburgh J5 ..... 5.65
Seattle B3 ..... 6.55
Sharon,Pa. S8 ..... 5.75
So.Chicago,Ill. U5 ..... 5.65
SparrowsPoint,Md. B2 .. 5.65
Warren,O. R2 ..... 5.65
Youngstown Y1 ..... 6.15

PLATES, Open-Hearth Alloy
Claymont,Del. C22 ..... 4.85
Coatesville,Pa. L7 ..... 5.25
Conshohocken,Pa. A3 ..... 5.05
Fontana,Calif. K1 ..... 5.70
Gary,Ind. U5 ..... 4.75
Johnstown,Pa. B2 ..... 4.75
Munhall,Pa. U5 ..... 4.75
Sharon,Pa. S8 ..... 5.20
So.Chicago,Ill. U5 ..... 4.75
SparrowsPoint,Md. B2 .. 4.75

FLOOR PLATES
Cleveland J5 ..... 4.75
Conshohocken,Pa. A3 ..... 4.75
Harrisburg,Pa. C5 ..... 5.95
Ind.Harbor,Ind. I-2 ..... 4.75
Munhall,Pa. U5 ..... 4.75
So.Chicago,Ill. U5 ..... 4.75

PLATES, Ingot Iron
Ashland,c.l.(15) A10 ..... 3.95
Ashland,l.c.l.(15) A10 ..... 4.45
Cleveland,c.l. R2 ..... 4.30
Warren,O.c.l. R2 ..... 4.30

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..... 3.70
Aliquippa,Pa. J5 ..... 3.70
Ashland,Ky. (15) A10 ..... 3.70
Bessemer,Ala. T2 ..... 3.70
Clairton,Pa. U5 ..... 3.70
Claymont,Del. C22 ..... 4.15
Cleveland J5, R2 ..... 3.70
Coatesville,Pa. L7 ..... 4.15
Conshohocken,Pa. A3 .. 4.15
Fairfield,Ala. T2 ..... 3.70
Fontana,Calif.(30) K1 .. 4.30
Gary,Ind. U5 ..... 3.70
GraniteCity,Ill. G4 ..... 4.40
Geneva,Utah, G1 ..... 3.70
Harrisburg,Pa. C5 ..... 6.75
Houston,Tex. S5 ..... 4.10
Ind.Harbor,Ind. I-2, Y1 .. 3.70
Johnstown,Pa. B2 ..... 3.70
Lackawanna,N.Y. B2 ..... 3.70
Minnequa,Colo. C10 ..... 4.50
Munhall,Pa. U5 ..... 3.70
Pittsburgh J5 ..... 3.70
Seattle B3 ..... 4.60
Sharon,Pa. S3 ..... 3.95
So.Chicago,Ill. U5, W14 .. 3.70
SparrowsPoint,Md. B2 .. 3.70
Steubenville,O. W10 ..... 3.70
Warren,O. R2 ..... 3.70
Weirton,W.Va. W6 ..... 4.00
Youngstown R2, U5, Y1 .. 3.70

PLATES, Carbon A.R.
Fontana,Calif. K1 ..... 5.45
Geneva, Utah G1 ..... 4.85

PLATES Wrought Iron
Economy,Pa. B14 ..... 8.60

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ..... 3.70
Aliquippa,Pa. J5 ..... 3.70
Alton,Ill. L1 ..... 4.15
Atlanta,Ga. A11 ..... 4.25
Bessemer,Ala. T2 ..... 3.70
Buffalo R2 ..... 3.70
Canton,O. R2 ..... 3.70
Clairton,Pa. U5 ..... 3.70
Cleveland R2 ..... 3.70
Detroit R7 ..... 3.85
Emeryville,Calif. J7 ..... 4.45
Fairfield,Ala. T2 ..... 3.70
Fontana,Calif. K1 ..... 4.40
Gary,Ind. U5 ..... 3.70
Houston,Tex. S5 ..... 4.10
Ind.Harbor,Ind. I-2, Y1 .. 3.70
Johnstown,Pa. B2 ..... 3.70
KansasCity,Mo. S5 ..... 4.30
Lackawanna,N.Y. B2 ..... 3.70
LosAngeles B3 ..... 4.40
Milton,Pa. B6 ..... 4.20
Minnequa,Colo. C10 ..... 4.15
Niles,Calif. P1 ..... 5.05
N.Tonawanda,N.Y. B11 .. 3.70
Pittsburg,Calif. C11 ..... 4.40
Pittsburgh J5 ..... 3.70
Portland,Oreg. O4 ..... 4.65
Seattle B3, N14 ..... 4.45
So.Chicago R2,U5,W14 .. 3.70
So.Duquesne,Pa. U5 ..... 3.70
So.SanFran.,Cal. B3 ..... 4.45
Struthers,O. Y1 ..... 3.70
Torrance,Calif. C11 ..... 4.40
Weirton,W.Va. W6 ..... 3.85
Youngstown R2, U5 ..... 3.70

BAR SIZE ANGLES, S. SHAPES
Aliquippa,Pa. J5 ..... 3.70
Atlanta A11 ..... 4.25
Johnstown,Pa. B2 ..... 3.70
Lackawanna,N.Y. B2 ..... 3.70
Niles,Calif. P1 ..... 5.05
Portland,Oreg. O4 ..... 4.65
SanFrancisco S7 ..... 4.85

BAR SIZE ANGLES, H.R CARBON
Bethlehem,Pa. B2 ..... 3.90

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ..... 4.30
Buffalo R2 ..... 4.30
Canton,O. R2 ..... 4.30
Canton,O.(29) T7 ..... 3.95
Clairton,Pa. U5 ..... 4.30
Detroit R7 ..... 4.45
Ecorse,Mich. G5 ..... 4.65
Fontana,Calif. K1 ..... 5.35
Gary,Ind. U5 ..... 4.30
Houston,Tex. S5 ..... 4.70
Ind.Harbor,Ind. I-2, Y1 .. 4.30
Johnstown,Pa. B2 ..... 4.30
KansasCity,Mo. S5 ..... 4.90
Lackawanna,N.Y. B2 ..... 4.30
LosAngeles B3 ..... 5.35
Massillon,O. R2 ..... 4.30
Midland,Pa. C18 ..... 4.30
So.Chicago R2,U5,W14 .. 4.30
So.Duquesne,Pa. U5 ..... 4.30
Struthers,O. Y1 ..... 4.30
Warren,O. C17 ..... 4.30
Youngstown U5 ..... 4.30

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 ..... 4.55
Gary,Ind. U5 ..... 4.55
Youngstown U5 ..... 4.55

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa,Pa. J5 ..... 5.55
Bessemer,Ala. T2 ..... 5.55
Bethlehem,Pa. B2 ..... 5.55
Clairton,Pa. U5 ..... 5.55
Cleveland R2 ..... 5.55
Fairfield,Ala. T2 ..... 5.55
Fontana,Calif. K1 ..... 6.60
Gary,Ind. U5 ..... 5.55
Ind.Harbor,Ind. I-2 ..... 5.55
IndianaHarbor,Ind. Y1 .. 6.05
Johnstown,Pa. B2 ..... 5.55
Lackawanna,N.Y. B2 ..... 5.55
LosAngeles B3 ..... 6.25
Pittsburgh J5 ..... 5.55
Seattle B3 ..... 6.30
So.Duquesne,Pa. U5 ..... 5.55
So.SanFrancisco B3 ..... 6.30
Struthers, O. Y1 ..... 6.05
Youngstown U5 ..... 5.55

BARS,Cold-Finished Carbon
Ambridge,Pa. W18 ..... 4.55
BeaverFalls,Pa. M12,R2 .. 4.55
Buffalo B5 ..... 4.60
Camden,N.J. P13 ..... 5.00
Carnegie,Pa. C12 ..... 4.55
Chicago W18 ..... 4.55
Cleveland A7, C20 ..... 4.55
Detroit P17 ..... 4.70
Donora,Pa. A7 ..... 4.55
Elyria,O. W8 ..... 4.55
FranklinPark, Ill. N5 ..... 4.55
Gary,Ind. R2 ..... 4.55
GreenBay, Wis. F7 ..... 4.55
Hammond,Ind. L2, M13 .. 4.55
Hartford,Conn. R2 ..... 5.10
Harvey,Ill. B5 ..... 4.55
LosAngeles R2 ..... 6.00
Mansfield,Mass. B5 ..... 5.10
Massillon,O. R2, R8 ..... 4.55
Monaca, Pa. S17 ..... 4.55
Newark,N.J. W18 ..... 5.00
Plymouth,Mich. P5 ..... 4.80
Pittsburgh J5 ..... 4.55
Putnam,Conn. W18 ..... 5.10
Readville,Mass. C14 ..... 5.10
St. Louis,Mo. M5 ..... 4.95
So.Chicago,Ill. W14 ..... 4.55
SpringCity,Pa. (5) K3 ..... 5.00
Struthers,O. Y1 ..... 4.55
Waukegan,Ill. A7 ..... 4.55
Youngstown F3, Y1 ..... 4.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ..... 5.40
BeaverFalls,Pa. M12 ..... 5.40
Bethlehem,Pa. B2 ..... 5.40
Buffalo B5 ..... 5.40
Camden,N.J. P13 ..... 5.80
Canton,O. R2 ..... 5.40
Canton,O.(29) T7 ..... 4.90
Carnegie,Pa. C12 ..... 5.40
Chicago W18 ..... 5.40
Cleveland A7 ..... 5.45
Cleveland C20 ..... 5.40
Detroit P17 ..... 5.55
Donora,Pa. A7 ..... 5.45
Elyria,O. W8 ..... 5.40
Gary,Ind. R2 ..... 5.40
Hammond,Ind. L2, M13 .. 5.40
Hartford,Conn. R2 ..... 5.85
Harvey,Ill. B5 ..... 5.40
Lackawanna,N.Y. B2 ..... 5.40
Mansfield,Mass. B5 ..... 5.85
Massillon,O. R2,R8 ..... 5.40
Midland,Pa. C18 ..... 5.40
Monaca,Pa. S17 ..... 5.40
Newark,N.J. W18 ..... 5.75
Plymouth,Mich. P5 ..... 5.60
So.Chicago,Ill. R2, W14 .. 5.40
Struthers,O. Y1 ..... 5.40
Warren,O. C17 ..... 5.40
Waukegan,Ill. A7 ..... 5.45
Worcester,Mass. A7 ..... 5.75
Youngstown F3, Y1 ..... 5.40

RAIL STEEL BARS
ChicagoHts.(3,4) C2 ..... 4.75
ChicagoHts.(3,4)s 1-2 ..... 4.75
Franklin Pa.(3,4) F5 ..... 4.75
FortWorth,Tex.(26) T4 ..... 4.95
Huntngtn,W.Va.(3) W7 ..... 5.50
Marion,O.(3) P11 ..... 4.75
Moline,Ill.(3) R2 ..... 3.80
Tonawanda(3,4) B12 ..... 4.75
Williamsport(3) S18 ..... 5.00
Williamsport(4) S18 ..... 5.10

BARS, Wrought Iron
Dover,N.J.(Staybolt) U1 .. 15.00
Dover,(Eng.Bolt) U1 ..... 13.50
Dover,(Forg.Iron) U1 ..... 12.25
Economy,Pa.(8,R.) B14 .. 9.60
Economy,Pa.(D.R.)B14 .. 11.90
Economy,(Staybolt)B14 .. 12.20
McK.Rks.(Staybolt) L5 .. 14.50
McK.Rks.(8,R.) L5 ..... 9.60
McK.Rks.(D.R.) L5 ..... 13.00

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ..... 3.70
Atlanta A11 ..... 4.25
Buffalo R2 ..... 3.70
Cleveland R2 ..... 3.70
Emeryville,Calif. J7 ..... 4.45
Fairfield,Ala. T2 ..... 3.70
Fontana,Calif. K1 ..... 4.40
Gary,Ind. U5 ..... 3.70
Houston,Tex. S5 ..... 4.10
Ind.Harbor,Ind. I-2, Y1 .. 3.70
Johnstown,Pa. B2 ..... 3.70
KansasCity,Mo. S5 ..... 4.30
Lackawanna,N.Y. B2 ..... 3.70
LosAngeles B3 ..... 4.40
Milton,Pa. B6 ..... 4.20
Minnequa,Colo. C10 ..... 4.15
Niles,Calif. P1 ..... 5.05
Pittsburg,Calif. C11 ..... 4.40
Portland,Oreg. O4 ..... 4.65
SanFrancisco S7 ..... 4.85
Seattle B3 ..... 4.60
So.Chicago,Ill. R2, U5 .. 3.70
So.SanFrancisco B3 ..... 4.45
Struthers,O. Y1 ..... 3.70
Sparrows Point,Md. B2 .. 3.70
Torrance,Calif. C11 ..... 4.40
Weirton,W.Va. W6 ..... 3.85
Youngstown R2, U5, Y1 .. 3.70

BARS, Rerolling (Fabricators)
Buffalo R2 ..... 3.70
Cleveland R2 ..... 3.70
Emeryville,Calif. J7 ..... 4.45
Fairfield,Ala. T2 ..... 3.70
Fontana,Calif. K1 ..... 4.40
Gary,Ind. U5 ..... 3.70
Houston,Tex. S5 ..... 4.10
Ind.Harbor,Ind. I-2, Y1 .. 3.70
Johnstown,Pa. B2 ..... 3.70
KansasCity,Mo. S5 ..... 4.30
Lackawanna,N.Y. B2 ..... 3.70
LosAngeles B3 ..... 4.40
Milton,Pa. B6 ..... 4.20
Minnequa,Colo. C10 ..... 4.15
Niles,Calif. P1 ..... 5.05
Pittsburg,Calif. C11 ..... 4.40
Portland,Oreg. O4 ..... 4.65
SanFrancisco S7 ..... 4.85
Seattle B3 ..... 4.60
So.Chicago,Ill. R2, U5 .. 3.70
So.SanFrancisco B3 ..... 4.45
Struthers,O. Y1 ..... 3.70
Sparrows Point,Md. B2 .. 3.70
Torrance,Calif. C11 ..... 4.40
Weirton,W.Va. W6 ..... 3.85
Youngstown R2, U5, Y1 .. 3.70

BARS, H.R., (14 ga. heavier) High-Strength Low-Alloy
Cleveland J5, R2 ..... 5.40
Conshohocken,Pa. A3 ..... 5.65
Ecorse,Mich. G5 ..... 5.95
Fairfield,Ala. T2 ..... 5.40
Fontana,Calif. K1 ..... 6.35
Gary,Ind. U5 ..... 5.40
Ind.Harbor,Ind. I-2 ..... 5.40
IndianaHarbor,Ind. Y1 .. 5.90
Irvin,Pa. U5 ..... 5.40
Lackawanna(35) B2, ... 5.40
Pittsburgh J5 ..... 5.40
Sharon,Pa. S3 ..... 5.40
So.Chicago,Ill. U5 ..... 5.40
SparrowsPoint (36) B2 .. 5.40
Warren,O. R2 ..... 5.40
Weirton,W.Va. W6 ..... 5.40
Youngstown U5 ..... 5.40
Youngstown Y1 ..... 5.90

SHEETS, Cold-Rolled High-Strength Low-Alloy
Cleveland J5, R2 ..... 6.55
Ecorse,Mich. G5 ..... 7.10
Fontana,Calif. K1 ..... 7.50
Gary,Ind. U5 ..... 6.55
IndianaHarbor,Ind. Y1 .. 7.05
IndianaHarbor,Ind. I-2 .. 6.55
Irvin,Pa. U5 ..... 6.55
Lackawanna(37) B2 ..... 6.55
Pittsburgh J5 ..... 6.55
SparrowsPoint(38) B2 .. 6.55
Warren,O. R2 ..... 6.55
Weirton,W.Va. W6 ..... 6.90
Youngstown Y1 ..... 7.05

SHEETS, H.R., (19 gage) High-Strength Low-Alloy
AlabamaCity,Ala. R2 ..... 4.75
Dover,O. R1 ..... 5.65
Ind.Harbor,Ind. I-2 ..... 5.40
Mansfield,O. E6 ..... 5.65
Niles,O. N12 ..... 5.75
Torrance,Calif. C11 ..... 5.40

SHEETS, H.R., (14 ga., heavier) High-Strength Low-Alloy
Cleveland J5, R2 ..... 5.40
Conshohocken,Pa. A3 ..... 5.65
Ecorse,Mich. G5 ..... 5.95
Fairfield,Ala. T2 ..... 5.40
Fontana,Calif. K1 ..... 6.35
Gary,Ind. U5 ..... 5.40
Ind.Harbor,Ind. I-2 ..... 5.40
IndianaHarbor,Ind. Y1 .. 5.90
Irvin,Pa. U5 ..... 5.40
Lackawanna(35) B2, ... 5.40
Pittsburgh J5 ..... 5.40
Sharon,Pa. S3 ..... 5.40
So.Chicago,Ill. U5 ..... 5.40
SparrowsPoint (36) B2 .. 5.40
Warren,O. R2 ..... 5.40
Weirton,W.Va. W6 ..... 5.40
Youngstown U5 ..... 5.40
Youngstown Y1 ..... 5.90

SHEETS, Cold-Rolled High-Strength Low-Alloy
Cleveland J5, R2 ..... 6.55
Ecorse,Mich. G5 ..... 7.10
Fontana,Calif. K1 ..... 7.50
Gary,Ind. U5 ..... 6.55
IndianaHarbor,Ind. Y1 .. 7.05
IndianaHarbor,Ind. I-2 .. 6.55
Irvin,Pa. U5 ..... 6.55
Lackawanna(37) B2 ..... 6.55
Pittsburgh J5 ..... 6.55
SparrowsPoint(38) B2 .. 6.55
Warren,O. R2 ..... 6.55
Weirton,W.Va. W6 ..... 6.90
Youngstown Y1 ..... 7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.25
Cleveland J5, R2	4.35
Ecorse,Mich. G5	4.55
Fairfield,Ala. T2	4.35
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	5.30
Gary,Ind. U5	4.35
GraniteCity,Ill. G4	5.05
Ind Harbor,Ind. I-2, Y1	4.35
Irvin,Pa. U5	4.35
Lackawanna,N.Y. B2	4.35
Middletown,O. A10	4.35
Pittsburg,Calif. C11	5.30
Pittsburgh J5	4.35
SparrowsPoint,Md. B2	4.35
Steubenville,O. W10	4.35
Warren,O. R2	4.35
Weirton,W.Va. W6	4.35
Youngstown Y1	4.35

SHEETS, Galv'd No. 10 Steel

AlabamaCity Ala. R2	4.80
Ashland,Ky.(8) A10	4.80
Canton,O. R2	4.80
Dover,O. R1	5.50
Fairfield,Ala. T2	4.80
Gary,Ind. U5	4.80
GraniteCity,Ill. G4	5.50
Ind Harbor,Ind. I-2	4.80
Irvin,Pa. U5	4.80
Kokomo,Ind.(13) C16	5.20
MartinsFerry,O. W10	4.80
Niles,O. N12	6.00
Pittsburg,Calif. C11	5.55
SparrowsPoint,Md. B2	4.80
Steubenville,O. W10	4.80
Torrance,Calif. C11	5.55
Weirton,W.Va. W6	4.80

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. U5	7.20
SparrowsPoint(39) B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	5.35
Irvin,Pa. U5	5.35
Kokomo,Ind.(13) C16	5.75
Niles,O. N12	6.55

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	5.05
Middletown,O. A10	5.05

SHEETS, Electro Galvanized

Cleveland R2 (2s)	5.65
Niles,O. R2 (2s)	5.65
Weirton,W.Va. W6	5.50

SHEETS, Zinc Alloy

Ind Harbor,Ind. I-2	5.70

SHEETS, Drum Body

Pittsburg,Calif. C11	4.30
Torrance,Calif. C11	4.30

SHEETS, Well Casing

Fontana,Calif. K1	5.10
Torrance,Calif. C11	5.10

BLUED Stock, 29 ga.

Yorkville,O. W10	6.80
Follansbee,W.Va.(23) F4	6.85

ROOFING SHORT TERNES (8 lb. Coated)

Gary,Ind. U5	9.50

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$7.60
Gary,Ind. U5	7.50
Irvin,Pa. U5	7.50
SparrowsPoint,Md. B2	7.60
Yorkville,O. W10	7.50

SHEETS, LT. Coated Ternes, 6 lb (Commercial Quality)

Yorkville,O. W10	$8.40

SHEETS, Mfg. Ternes, 8 lb (Commercial Quality)

Gary,Ind. U5	$9.50
Yorkville,O. W10	9.50

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10	5.20
Gary,Ind. U5	5.20
Mansfield,O. E6	6.05
Middletown,O. A10	5.20
Niles,O. N12	6.00
Weirton,W.Va. W6	5.20

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.60

SHEETS, Enameling Iron

Ashland,Ky.(8) A10	4.65
Cleveland R2	4.65
Gary,Ind. U5	4.65
GraniteCity,Ill. G4	5.35
Ind.Harbor,Ind. I-2	4.65
Irvin,Pa. U5	4.65
Middletown,O. A10	4.65
Youngstown Y1	4.65

SHEETS, Culvert	Cu	Cu
No. 16	Alloy	Fe
Ashland,Ky. A10	5.60	...
Canton,O. R2	5.65	6.10
Fairfield,Ala. T2	5.60	5.85
Gary,Ind. U5	5.60	5.85
IndianaHarbor I-2	5.60	5.85
Irvin,Pa. U5	5.60	5.85
Kokomo,Ind. C16	6.25	...
MartinsFy.O. W10	5.60	5.85
Pittsburg,Cal. C11	6.35	...
SparrowsPt. B2	5.60	...
Torrance,Cal. C11	6.35	...

SHEETS, Culvert, No. 16 Pure Iron

Ashland,Ky. A10	5.85
Fairfield,Ala. T2	5.85

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	3.85
Cleveland R2	4.20
Ind Harbor,Ind. I-2	3.85
Warren,O. R2	4.20

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.95
Middletown,O. A10	4.85
Warren,O. R2	4.95

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10	5.05
Canton,O. R2	5.55

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	5.30
Middletown,O. A10	5.30

SHEETS, ALUMINIZED

Butler,Pa. A10	8.15

TIN PLATE, Electrolytic (Base Box)

	0.25-lb	0.50 lb	0.75lb
Aliquippa,Pa. J5	$7.15	$7.40	$7.80
Fairfield,Ala. T2	7.25	7.50	7.90
Gary,Ind. U5	7.15	7.40	7.80
GraniteCity,Ill. G4	7.35	7.60	8.00
Ind Harbor,Ind. I-2, Y1	7.15	7.40	7.80
Irvin,Pa. U5	7.15	7.40	7.80
Niles,O. R2	7.15	7.40	7.80
Pittsburg,Calif. C11	7.90	8.15	8.55
SparrowsPoint,Md. B2	7.25	7.50	7.90
Weirton,W.Va. W6	7.15	7.40	7.80
Yorkville,O. W10	7.15	7.40	7.80

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (Cut Lengths ½c lower)	Field	Arma-ture	Elec-tric	Motor	Dyna-mo
BeechBottom W10 (cut-lengths)	...	...	7.25	8.50	9.30
Brackenridge,Pa. A4	...	...	7.75	9.00	9.80
GraniteCity,Ill. G4 (cut lengths)	...	...	7.95	9.20	...
Ind.Harbor,Ind. I-2	6.95	7.25	(34)	...	...
Mansfield,O. E6 (cut lengths)	7.10	7.25	7.75	9.00	9.80
Niles,O. N12 (cut lengths)	...	6.75	7.25	...	...
Vandergrift,Pa. U5	...	7.25	7.75	9.00	9.80
Warren,O. R2	6.95	7.25	7.75	9.00	9.80
Zanesville,O. A10	...	7.25	7.75	9.00	9.80

SHEETS, SILICON (22 Ga. Base) Coils (Cut Lengths ½c lower) Transformer Grade	72	65	58	52
BeechBottom W10 (cut lengths)	9.85	10.40	11.10	11.90
Brackenridge,Pa. A4	10.35	...	...	...
Vandergrift,Pa. U5	10.35	10.90	11.60	12.40
Warren,O. R2	10.35	...	...	...
Zanesville,O. A10	10.35	10.90	11.60	12.40

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)	...	...	14.75	15.25
Vandergrift,Pa. U5	12.90	13.75	14.75	15.25

TINPLATE,American Coke (Base Box)

	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.45	$8.70
Fairfield,Ala. T2	8.55	8.80
Gary,Ind. U5	8.45	8.70
Ind.Har. I-2, Y1	8.45	8.70
Irvin,Pa. U5	8.45	8.70
Pitts.Cal. C11	9.20	9.45
Sp.Pt.,Md. B2	8.55	8.80
Warren,O. R2	8.45	8.70
Weirton,W.Va. W6	8.45	8.70
Yorkville,O. W10	8.45	8.70

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$6.25
Fairfield,Ala. T2	6.35
Gary,Ind. U5	6.25
GraniteCity,Ill. G4	6.45
Ind.Harbor,Ind. I-2, Y1	6.25
Irvin,Pa. U5	6.25
Niles,O. R2	6.25
Pittsburg,Calif. C11	7.00
SparrowsPoint,Md. B2	6.35
Warren,O. R2	6.25
Weirton,W.Va. W6	6.25
Yorkville,O. W10	6.25

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4	5.85
Gary,Ind. U5	5.85
GraniteCity,Ill. G4	6.05
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. U5	5.85
Yorkville,O. W10	6.15

STRIP, Hot-Rolled Alloy

Bridgeprt.Conn.(10)	S15 5.45
Carnegie,Pa. S18	5.55
Fontana,Calif. K1	6.70
Gary,Ind. U5	5.50
Houston,Tex. S5	5.90
KansasCity,Mo. S5	6.10
Midland,Pa. C18	5.85
NewBritn.Conn.(10)	S15 5.45
Sharon,Pa. S8	5.85
Youngstown U5	5.50

STRIP, Hot-Rolled, High-Strength Low-Alloy

Bessemer,Ala. T2	5.30
Conshohocken,Pa. A3	5.55
Ecorse,Mich. G5	5.95
Fairfield,Ala. T2	5.30
Fontana,Calif. K1	6.20
Gary,Ind. U5	5.30
Ind.Harb.,Ind. I-2	5.30
IndianaHarbor,Ind. Y1	5.80
Lackawanna,N.Y. B2	4.95
Los Angeles(25) B3	6.05
Seattle B3	6.30
Sharon,Pa. S3	5.40
So.SanFrancisco(25) B3	6.05
SparrowsPoint,Md. B2	4.95
Warren,O. R2	5.30
Weirton,W.Va. W6	5.75
Youngstown Y1	5.80
Youngstown U5	5.30

STRIP, Cold-Rolled, High-Strength Low-Alloy

Cleveland J5	6.70
Cleveland A7	6.55
Dover,O. G6	7.30
Fontana,Calif. K1	6.95
Lackawanna,N.Y. B2	6.40
Sharon,Pa. S3	6.55
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.55
Weirton,W.Va. W6	7.20
Youngstown Y1	7.05

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	3.50
Alton,Ill. L1	3.95
Ashland,Ky.(8) A10	3.50
Atlanta M1	4.05
Bessemer,Ala. T2	3.50
Bridgeprt.Conn.(10)	S15 4.00
Buffalo(27) R2	3.50
Butler,Pa. A10	3.50
Carnegie,Pa. S18	4.00
Conshohocken,Pa. A3	3.80
Detroit M1	4.05
Ecorse,Mich. G5	3.80
Fairfield,Ala. T2	3.50
Fontana,Calif. K1	4.75
Gary,Ind. U5	3.50
Houston,Tex S5	4.90
Ind.Harbor,Ind. I-2, Y1	3.50
Johnstown,Pa.(25) B2	3.50
KansasCity,Mo.(9) S5	4.10
Lackawanna,N.Y.(32) B2	3.50
LosAngeles B3	4.25
Milton,Pa. B6	4.00
Minnequa,Colo. C10	4.55
NewBritain(10) S15	4.00
No.Tonawanda,N.Y. B11	3.50
Pittsburg,Calif. C11	4.25
Riverdale,Ill. A1	3.50
SanFrancisco S7	4.85
Seattle B3, N14	4.00
Sharon,Pa. S3	4.00
So.Chicago,Ill. W14	3.50
So SanFrancisco B3	4.25
SparrowsPoint,Md. B2	3.50
Torrance,Calif. C11	4.25
Warren,O. R2	3.50
Weirton,W.Va. W6	3.60
WestLeechburg,Pa. A4	3.75
Youngstown U5, Y1	3.50

STRIP, Cold-Rolled Alloy Steel

Bridgeprt.Conn.(10)	S15 10.75
Carnegie,Pa. S18	10.60
Cleveland A7	10.00
Dover,O. G6	10.50
Fontana,Calif. K1	11.65
Harrison,N.J. C18	10.60
Midland,Pa. C18	10.60
NewBritn.Conn.(10)	S15 10.75
Pawtucket,R.I.(11)	NS 10.75
Pawtucket,R.I.(12)	NS 11.05
Sharon,Pa. S3	10.60
Worcester,Mass. A7	10.30
Youngstown C8	10.60

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	5.50
Berea,O. C7	6.60
Bridgeprt.Conn.(10)	S15 5.35
Butler,Pa. A10	4.65
Cleveland A7, J5	4.65
Dearborn,Mich. D3	5.60
Detroit D2	5.60
Detroit M1	4.65
Dover,O.(40) G6	5.50
Ecorse,Mich. G5	4.85
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	6.30
FranklinPark,Ill.(40) T6	4.90
Ind.Harbor,Ind. I-2	4.90
Lackawanna,N.Y. B2	4.65
LosAngeles C1	5.40
Maitapan,Mass. T6	5.50
Middletown,O. A10	4.65
NewBritain(10) S15	5.35
NewCastle,Pa. B4	5.35
NewCastle(40) E5	5.25
NewHaven,Conn. D2	5.85
NewHaven,Conn. A7	5.15
Pawtucket,R.I. R3	6.00
Pawtucket,R.I.(21)	NS 5.85
Riverdale,Ill.(40) A1	4.90
Rome,N.Y. R6	5.10
Sharon,Pa. S3	5.35
SparrowsPoint,Md. B2	4.65
Trenton,N.J. R5	6.00
Wallingford,Conn. W2	5.85
Warren,O.(40) T5	5.25
Warren,O. R2	4.65
Weirton,W.Va. W6	4.65
Youngstown C8 (40)	5.25
Youngstown Y1	4.65

STRIP, Electro Galvanized

Dover,O. G6	5.50
Warren,O. T5	5.25
Weirton,W.Va. W6	4.65
Youngstown C8	5.25

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea,O. C7	...	6.80	7.40	9.35	11.65
Bridgeport,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
Bristol,Conn. W1	...	...	7.70	9.65	...
Carnegie,Pa. S18	...	6.80	7.40	9.35	11.65
Cleveland A7	4.65	6.45	7.40	9.35	11.65
Dearborn,Mich. D3	5.60	7.05	7.65	...	...
Detroit D2	5.60	6.65	7.25	...	...
Dover,O. G6	5.50	6.80	7.40	9.35	11.65
FranklinPark,Ill. T6	5.00	6.60	7.55	9.50	11.80
Harrison,N.J. C18	...	...	7.70	9.65	11.95
Mattapan,Mass. T6	5.50	6.75	7.70	9.65	11.95
NewBritn.Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
NewCastle,Pa. B4	5.35	6.80	7.40	9.35	...
NewCastle,Pa. E5	5.50	6.80	7.40	9.35	11.65
NewHaven,Conn. D2	5.85	6.75	7.35	...	...
NewYork W3	...	7.10	7.70	9.65	11.95
Pawtucket,R.I. NS: Cleve.orPitt.Base	...	6.80	7.40	9.35	11.65
Worcester,Mass.,Base	5.85	7.10	7.70	9.65	11.95
Sharon,Pa. S3	5.35	6.80	7.40	9.35	11.65
Trenton,N.J. R5	...	7.10	7.70	9.65	11.95
Wallingford,Conn. W2	5.85	6.75	7.35	9.30	11.60
Weirton,W.Va. W6	5.35	6.80	7.40	9.35	11.65
Worcester,Mass. A7	4.95	6.75	7.35	9.35	11.95
Worcester,Mass. T6	5.50	6.75	7.70	9.65	11.95
Youngstown C8	...	6.80	7.40	9.35	11.65

Spring Steel (Tempered)					
Trenton,N.J. R5	...	...	10.30	12.50	15.35
Harrison,N.J. C18	...	...	10.30	12.50	15.35
NewYork W3	...	...	10.30	12.50	15.35

Key to Producers

A1 Acme Steel Co.
A3 Allan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Tube
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Bolardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B12 Buffalo Steel Co.
B14 A. M. Byers Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia Steel Co.
C12 Columbia Steel & Shaft
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Corp.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D5 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire

G1 Geneva Steel Co.
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky. (8) A10	3.75
Warren,O. R2	4.10

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	5.25

TIGHT COOPERAGE HOOP

Atlanta A11	4.05
Riverdale,Ill. A1	3.90
Sharon,Pa. S3	4.15
Youngstown U5	3.75

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
Alabama City R2	5.70	5.95
Aliquippa J5	5.70	6.15
Atlanta A11	5.95	6.40
Bartonville(19) K4	5.70	6.15
Buffalo W12	4.85	
Cleveland A7	5.70	6.15
Crawfordsville MS	5.95	6.40
Donora,Pa. A7	5.70	6.15
Duluth,Minn. A7	5.70	6.15
Fairfield T2	5.70	6.15
Houston, Tex. S5	6.10	6.55
Johnstown B2	5.70	6.15
Joliet, Ill. A7	5.70	6.15
KansasCy,Mo. S5	6.30	6.75
Kokomo C16	5.80	6.05
LosAngeles B3	6.65	
Minnequa C10	5.95	6.45
Monessen P7	5.95	6.40
Palmer W12	5.15	
Pitts,Calif. C11	6.65	6.80
Prtsmth.(18)P12	6.10	6.60
Rankin A7	5.70	6.15
So.Chicago R2	5.70	5.95
So.S.Fran. C10	6.65	7.10
SparrowsPt. B2	5.80	6.25
Sterling,Ill.(1)N15	6.15	
Struthers,O. Y1	5.70	6.15
Torrance,Cal. C11	6.65	
Worcester A7	6.00	6.45

WIRE (16 gage)	An'ld Stone	Galv. Stone
Aliquippa J5	10.15	12.15
Bartonville(1) K4	10.25	11.95
Cleveland A7	10.25	12.15
Crawfrdsville MS	10.30	12.00
Fostoria,O. S1	10.40	13.00
Johnstown B2	10.25	12.15
Kokomo C16	10.25	11.95
Minnequa C10	10.40	12.40
Palmer,Mass.C12	10.25	12.15
Pitts.Cal. C11	10.65	12.50
Prtsmth.(18) P12	10.55	12.30
SparrowsPt. B2	10.35	12.25
Waukegan A7	10.25	12.15

ROPE WIRE	(A)	(B)
Aiton Ill. L1	8.65	8.90
Bartonville,Ill. K4	8.55	8.80
Buffalo W12	8.55	8.80
Fostoria,O. S1	8.85	9.10
Johnstown,Pa. B2	8.55	8.80
Monessen,Pa. P16	8.55	8.80
Monessen,Pa. P7	8.80	9.05
Palmer,Mass. W12	8.55	9.10
Portsmouth,O. P12	8.55	8.80
Roebling,N.J. R5	8.55	8.80
SparrowsPt. B2	8.65	8.90
Struthers,O. Y1	8.55	8.80
Worcester J4, T6	8.85	9.10

(A) Plow and Mild Plow.
(B) Improved Plow.

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	4.85
Aliquippa,Pa. J5	4.85
Atlanta A11	5.10
Aiton,Ill. L1	4.85
Bartonville,Ill.(1) K4	4.85
Buffalo W12	4.85
Chicago W13	5.10
Cleveland A7, C20	4.85
Crawfordsville,Ind. MS	5.10
Donora,Pa. A7	4.85
Duluth,Pa. A7	4.85
Fairfield,Ala. T2	4.85
Fostoria,O.(24) S1	5.35
Houston S5	5.25
Johnstown,Pa. B2	4.85
Joliet, Ill. A7	4.85
KansasCity, Mo. S5	5.45
Kokomo,Ind. C16	4.95
Los Angeles B3	5.80
Minnequa,Colo. C10	5.10
Monessen,Pa. P7	5.10
Newark, 6-8 ga. 1-1	5.50
No.Tonawanda B11	4.85
Palmer, Mass W12	5.15
Pittsburg, Calif. C11	5.80
Portsmouth,O. P12	5.20
Rankin,Pa. A7	4.85
So.Chicago,Ill. R2	4.85
So. SanFrancisco C10	5.80
SparrowsPoint,Md. B2	4.95
Sterling,Ill.(1) N15	4.85
Struthers,O. Y1	4.85
Torrance,Calif. C11	5.80
Waukegan,Ill. A7	4.85
Worcester,Mass. A7, T6	5.15

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	6.20
Buffalo W12	6.20
Cleveland A7	5.85
Crawfordsville,Ind. MS	6.20
Detroit D2	6.20
Dover,O. G6	6.20
Fostoria,O. S1	6.00
Kokomo,Ind. C16	5.70
Franklin Park,Ill. T6	6.20
Massillon,O. R8	5.85
Monessen,Pa. P16	5.85
Monessen,Pa. P7	6.10
NewHaven,Conn. D2	6.50
Pawtucket,R.I.(12) NS	6.85
Trenton,N.J. R5	6.15
Worcester A7	6.15
Worcester T6	6.50
Worcester W12	6.65

WIRE, Fine & Weaving(8" Coils)

Bartonville,Ill.(1) K4	8.90
Buffalo W12	8.90
Chicago W13	8.90
Cleveland A7	8.90
Crawfordsville, Ind. MS	8.95
Fostoria,O. S1	8.90
Johnstown,Pa. B2	8.90
Kokomo,Ind. C16	8.90
Monessen,Pa. P16	8.90
Palmer,Mass W12	9.20
Portsmouth,O. P12	8.90
Roebling,N.J. R5	9.20
Waukegan,Ill. A7	8.90
Worcester,Mass. A7, T6	9.20

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	8.50
Monessen,Pa. P16	8.50
Roebling,N.J. R5	8.80
SparrowsPoint,Md. B2	8.60
Johnstown,Pa. B2	8.50

WIRE, Tire Bead

Bartonville,Ill(1) K4	10.90
Monessen,Pa. P16	11.40
Roebling,N.J. R5	11.55

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	6.25
Aiton,Ill. L1	6.45
Bartonville,Ill.(1) K4	6.25
Buffalo W12	6.25
Cleveland A7	6.25
Donora,Pa. A7	6.25
Duluth A7	6.25
Fostoria,O. S1	6.25
Johnstown,Pa. B2	6.25
LosAngeles B3	7.20
Milbury,Mass.(12) N6	8.95
Monessen,Pa. P7, P16	6.25
Palmer,Mass. W12	6.55
Pittsburg,Calif. C11	7.20
Roebling,N.J. R5	6.55
Portsmouth,O. P12	6.25
So.Chicago,Ill. R2	6.25
SoSanFrancisco C10	7.20
SparrowsPoint,Md. B2	6.35
Struthers,O. Y1	6.25
Trenton,N.J. A7	6.55
Waukegan,Ill. A7	6.25
Worcester A7, T6, W12	6.55
Worcester,Mass J4	6.75

WIRE, Upholstery Spring

Aliquippa,Pa. J5	5.90
Aiton,Ill. L1	6.10
Buffalo W12	5.90
Cleveland A7	5.90
Donora,Pa. A7	5.90
Duluth,Minn. A7	5.90
Johnstown,Pa. B2	5.90
LosAngeles B3	6.85
Monessen,Pa. P7, P16	5.90
NewHaven,Conn. A7	6.20
Palmer,Mass. W12	6.20
Pittsburg,Calif. C11	6.85
Portsmouth,O. P12	5.90
Roebling,N.J. R5	6.20
So.Chicago,Ill. R2	5.90
So.SanFrancisco C10	6.85
SparrowsPoint,Md. B2	6.00
Torrance,Calif. C11	6.85
Trenton,N.J. A7	6.20
Waukegan,Ill. A7	5.90
Worcester,Mass. A7	6.20

WOVEN FENCE, 9-15½ Ga. Col.

AlabamaCity,Ala. R2	126
Ala.City,Ala.,17-18ga.R2	213
Aliquippa,Pa.9-14½ga.J5	130
Atlanta A11	130
Bartonville,Ill.(19) K4	130
Crawfordsville,Ind. MS	132
Donora,Pa. A7	130
Duluth,Minn. A7	130
Fairfield,Ala. T2	130
Houston,Tex. S5	138
Johnstown,Pa. B2	130
Johnstown,17ga.,6" B2	204
Johnstown,17ga.,4" B2	207
Joliet,Ill. A7	130
KansasCity,Mo. S5	142
Kokomo,Ind. C16	132
Minnequa,Colo. C10	138
Monessen,Pa. P7	130
Pittsburg,Calif. C11	153
Portsmouth,O.(18) P12	137
Rankin,Pa. A7	130
So.Chicago,Ill. R2	126
Sterling,Ill.(1) N15	130

FENCE POSTS

ChicagoHts.,Ill. C2	140
Duluth,Minn. A7	125
Franklin,Pa. F5	140
Huntington,W.Va. W7	140
Johnstown,Pa. B2	140
Marion,O. P11	140
Minnequa,Colo. C10	130
Moline,Ill. R2	136
So.Chicago R2	140
Tonawanda,N.Y. B12	140
Williamsport,Pa. S19	150

WIRE, Barbed	Col.
AlabamaCity,Ala. R2	136
Aliquippa,Pa. J5	140
Atlanta A11	143
Bartonville,Ill.(19) K4	143
Crawfordsville,Ind. MS	145
Donora,Pa. A7	140
Duluth,Minn. A7	140
Fairfield,Ala. T2	140
Houston,Tex. S5	148
Johnstown,Pa. B2	140
Joliet,Ill. A7	140
KansasCity,Mo. S5	152
Kokomo,Ind. C16	142
Minnequa,Colo. C10	146
Monessen,Pa. P7	145
Pittsburg,Calif. C11	160
Portsmouth,O.(18) P12	147
Rankin,Pa. A7	140
So.Chicago,Ill. R2	136
So.SanFran.,Calif. C10	160
SparrowsPoint,Md. B2	142
Sterling,Ill.(1) N15	140

BALE TIES, Single Loop	Col.
AlabamaCity,Ala. R2	123
Atlanta A11	126
Bartonville,Ill.(19) K4	123
Crawfordsville,Ind. MS	132
Donora,Pa. A7	123
Duluth,Minn. A7	123
Fairfield,Ala. T2	123
Joliet,Ill. A7	123
KansasCity,Mo. S5	135
Kokomo,Ind. C16	125
Minnequa,Colo. C10	128
Pittsburg,Calif. C11	147
So.Chicago,Ill. R2	123
So.SanFran.,Calif. C10	147
SparrowsPoint,Md. B2	125
Sterling,Ill.(1) N15	123

NAILS & STAPLES, Non-Stock

AlabamaCity,Ala. R2	6.10
Bartonville,Ill.(19) K4	5.95
Crawfordsville,Ind. MS	6.30
Donora,Pa. A7	5.95
Duluth,Minn. A7	5.95
Johnstown,Pa. B2	5.95
Joliet,Ill. A7	5.95
Kokomo,Ind. C16	5.95
Minnequa,Colo. C10	6.20
Pittsburg,Calif. C11	6.90
Portsmouth,O. P12	6.25
Rankin,Pa. A7	5.95
So.Chicago,Ill. R2	6.10
SparrowsPoint,Md. B2	6.05
Sterling,Ill.(1) N15	6.30
Worcester,Mass A7	6.25

NAILS, Cut (100 lb keg)

To dealers (33)	
Conshohocken,Pa. A3	$7.35
Wheeling,W.Va. W10	7.35

RAILS	Std. No. 1	Std. No. 2	Std. All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	3.60	3.50	3.55	4.00
Ensley,Ala. T2	3.60	3.50	...	4.00
Fairfield,Ala. T2	...	...	...	4.00
Gary,Ind. U5	3.60	3.50	3.55	...
Huntington,W.Va. W7	...	...	...	5.00
Ind.Harbor,Ind. I-2	3.60	3.50	3.55	...
Johnstown,Pa. B2	...	...	...	(16)4.00
Lackawanna B2	3.60	3.50	...	...
Minnequa,Colo. C10	3.60	3.50	...	4.50
Steelton,Pa. B2	3.60	3.50	...	...
Williamsport,Pa. S19	...	...	...	4.75

NAILS & STAPLES, Stock

To dealers & mfrs. (1)	Col.
AlabamaCity,Ala. R2	118
Aliquippa,Pa.(13) J5	118
Atlanta A11	121
Bartonville,Ill.(19) K4	118
Chicago,Ill. W13	118
Cleveland A9	125
Crawfordsville,Ind. M2	122
Donora,Pa. A7	118
Duluth,Minn. A7	118
Fairfield,Ala. T2	118
Galveston,Tex. D7	126
Houston,Tex. S5	126
Johnstown,Pa. B2	118
Joliet,Ill. A7	118
KansasCity,Mo. S5	130
Kokomo,Ind. C16	120
Minnequa,Colo. C10	123
Monessen,Pa. P7	124
Pittsburg,Calif. C11	137
Portsmouth,O. P12	124
Rankin,Pa. A7	118
So.Chicago,Ill. R2	118
SparrowsPoint,Md. B2	120
Sterling,Ill.(1) N15	118
Torrance,Calif. C11	138
Worcester,Mass. A7	124

STANDARD TRACK SPIKES

Ind.Harbor,Ind. I-2, Y1	6.15
KansasCity,Mo. S5	6.40
Lebanon,Pa. B2	6.15
Minnequa,Colo. C10	6.15
Pittsburgh J5	6.15
Seattle B3	6.65
So.Chicago,Ill. R2	6.15
Struthers,O. Y1	6.15
Youngstown R2	6.15

TRACK BOLTS (20) Treated

KansasCity,Mo. S5	9.85
Lebanon,Pa.(32¼ B2	9.85
Minnequa,Colo. C10	9.85
Pittsburgh O3, P14	9.85
Seattle B3	10.35

TIE PLATES

Fairfield,Ala. T2	4.50
Gary,Ind. U5	4.50
Ind.Harbor,Ind. I-2	4.50
Lackawanna,N.Y. B2	4.50
Minnequa,Colo. C10	4.50
Pittsburg,Calif. C11	4.65
Seattle B3	4.65
Steelton,Pa. B2	4.50
Torrance,Calif. C11	4.65

JOINT BARS

Bessemer,Pa. U5	4.70
Fairfield,Ala. T2	4.70
Ind.Harbor,Ind. I-2	4.70
Joliet,Ill. U5	4.70
Lackawanna,N.Y. B2	4.70
Minnequa,Colo. C10	4.70
Steelton,Pa. B2	4.70

AXLES

Ind.Harbor,Ind. S18	5.60
Johnstown,Pa. B2	5.60

TOOL STEEL

—Grade by Analysis—

Grade	$ per lb	W	Cr	V	Co	Mo	$ per lb
Reg. Carbon	0.230	20	4	1	12	.25	3.535-3.675
Extra Carbon	0.270	19	4	2	7	..	2.460
Spec. Carbon	0.325	18	4	1	4.75	..	2.125
Oil Hardening	0.350	18	4	2	9	..	2.445-2.630
5% CrHotWrk	0.350	13.5	4	3	..	..	1.60¾
Hi-Carbon-Cr	0.635	6.4	4.5	1.9	..	.5	0.96-0.965
18W,4Cr,1V	1.505	6	4	3	..	6	1.190
18W,4Cr,2V	1.650	1.5	4	1	..	8.5	0.810

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2, V3.

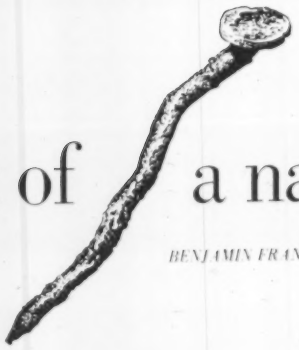
(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant. (4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pittsburgh base.
(12) Worcester, Mass. base.
(13) Add 0.50c for 17 Ga. & heavier.
(14) Also wide flange beams.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pittsburgh base.
(20) Deduct 0.25c for untreated.
(21) New Haven, Conn. base.
(22) Del. San Fran. Bay area.
(23) 28 Ga. 26" wide.
(24) Deduct 0.2lc, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing, mill lengths, to fabricators; to consumers, 0.60c.
(27) Bar mill sizes.
(28) Rerolled.
(29) Subject to 10% increase.
(30) Sheared; add 0.35c for universal mill.
(31) Not annealed.
(32) Rd. edge or square edge.
(33) To jobbers, deduct 20 cents.
(34) 7.25c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 gage & lighter; 60" & narrower.
(38) 14 gage & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.

Key to Producers

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.
N2 National Supply Co.
N3 National Tube Co.
N5 Nelsen Steel & Wire Co.
N6 NewEng-HighCarb.,Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Co.
N14 Northwst. Steel Roll Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills
P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield, S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
T2 Tenn. Coal, Iron & R.R.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
U1 Ulster Iron Works
U4 Universal Cyclops Steel
U5 United States Steel Co.
V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.
W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
Y1 YoungstownSheet&Tube

"For the want of a nail the shoe was lost,
For the want of a shoe the horse was lost,
For the want of a horse the rider was lost,
For the want of a rider the battle was lost,
For the want of a battle the Kingdom was lost . . .

and all for want of a nail"



BENJAMIN FRANKLIN, "Poor Richard," 1758

The fate of nations often hangs on little things. Take this rusty old nail. It symbolizes thousands of tons of worn-out machines and broken parts lying useless in our plants, factories, farms, and homes—scrap steel desperately needed today by our steel mills.

You can help make this nail, and all the other scrap you can collect, go to work again . . . in new steel for ships, tanks, and guns required for defense purposes.

So survey your plant now for every last bit of scrap. Then get it to your scrap dealer promptly. This will not only help assure the nation of the arms needed to preserve our freedom, but it will also mean more steel for your own products tomorrow.

ELECTRO METALLURGICAL COMPANY, a Division of Union Carbide and Carbon Corporation.

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Black A	Black B	Black C	Galvanized D	Galvanized E	Galvanized F
⅛	5.5c	0.24	34.0	32.0	29.0	1.5	+0.5	+3.5
¼	6.0	0.42	28.5	26.5	23.5	+1.0	+3.0	+6.0
⅜	6.0	0.57	23.5	21.5	18.5	+7.0	+9.0	+12.0
½	8.5	0.85	36.0	34.0	35.0	14.0	12.0	13.0
¾	11.5	1.18	39.0	37.0	38.0	18.9	16.0	17.0
1	17.0	1.68	41.5	39.5	40.5	21.5	19.5	20.5
1¼	23.0	2.28	42.0	40.0	41.0	22.0	24.0	21.0
1½	27.5	2.78	42.5	41.5	41.5	23.0	21.5	22.0
2	37	3.68	43.0	41.0	42.0	23.5	21.5	22.5
2½	58.5	5.82	43.5	41.5	42.5	24.0	22.0	23.0
3	76.5	7.62	43.5	41.5	42.5	24.0	22.0	23.0

Column A: Etna, Pa. N2; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va., 3½ points lower on ¼", 1½ points lower on ⅜", and 2 points lower on ½", W10; Sharon, Pa. M6, 1 point higher on ⅛", 2 points lower on ¼" and ⅜". Following make ½" and larger: Lorain, O., N3; Youngstown R2 and 36¼ % on 3½" and 4"; Youngstown Y1; Aliquippa, Pa. J5; Fontana, Calif. K1 quotes 11½ points lower on ½" and larger continuous weld and 24% on 3½" and 4". Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind., ½" through 3", Y1; Alton, Ill., 2 points lower discount L1.

Column D: Butler, Pa. F6, ⅛-⅜": Benwood, W. Va. W10, except plus 3½% on ⅛", plus 2½% on ¼", plus 9% on ⅜"; Sharon, Pa. M6, plus 0.5 on ¼", 1 point lower on ½", ¾", 1½ points lower on 1" and 1¼", 2 points lower on 1½", 2", 2½" and 3". Following quote only on ½" and larger: Lorain, O. N3; Youngstown R2, and 16½% on 3½" and 4"; Youngstown Y1. Aliquippa, Pa. J5 quotes 1 point lower on ¾", 2 points lower on 1", 1½ points lower on 1¼", 2 points lower on 1½" and 2", 1½ points lower on 2½" and 3"; Etna, Pa. N2 and 18½% on 3½" and 4".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	29.5	9.5	29.5	9.5
2½	58.5	5.82	32.5	12.5	32.5	12.5
3	76.5	7.62	32.5	12.5	32.5	12.5
3½	92.0	9.20	34.5	14.5	34.5	14.5
4	$1.09	10.89	34.5	14.5	34.5	14.5
5	1.48	14.81	37.0	17.0	37.0	17.0
6	1.92	19.18	37.0	17.0	37.0	17.0

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5 quotes 1½ pts lower on 2", 1 pt lower on 2½-6 in.; Lorain N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft. mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	13.45	16.47	15.36	15.36
1¼	13	16.09	19.71	15.61	18.19
1½	13	17.27	21.15	17.25	20.30
1¾	13	19.29	23.62	19.62	23.09
2	13	21.62	26.48	21.99	25.86
2¼	13	24.35	29.82	24.50	28.84
2½	12	26.92	32.97	26.98	31.76
2¾	12	29.65	36.32	29.57	34.76
2⅞	12	32.11	39.33	31.33	36.84
3	12	34.00	41.64	32.89	38.70

CLAD STEELS

(Cents per pound)

Cladding Stainless	Plates—Carbon Base 10%	Plates—Carbon Base 20%	Strip—Cold-Rolled Carbon Base Both Sides	Sheets—Carbon Base 10%	Sheets—Carbon Base 20%	Cu Base Both Sides
302	....	....	....	19.75	26.24–27.50	77.00
304	25.00	29.50	....	24.50	27.50–27.77	77.00
309	30.50	35.00	....	....	....	....
310	36.50	41.00	....	....	....	144.00
316	29.50	34.00	....	26.00	35.92–36.50	....
317	34.50	39.00	....	....	....	....
318	33.50	38.00	....	....	....	....
321	26.50	31.00–32.00	....	23.00	33.00	111.00
347	27.50	32.00	....	24.00	33.50–33.83	130.00
405	21.25	27.75	....	....	....	....
410	20.75	27.25	....	....	....	....
Nickel	33.55	45.15	41.00	54.00	....	....
Inconel	41.23	54.18	....	....	....	165.00
Monel	34.93	46.28	....	....	....	....
Copper*	....	....	23.70†	29.65‡	....	....

* Deoxidized. † 20.20c for hot-rolled. ‡ 26.40c for hot-rolled. Production points for carbon base products: Stainless plates, sheet, Conshohocken, Pa. A3 and New Castle, Ind. 1-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; nickel, copper-clad strip, Carnegie, Pa., S18. Production point for copper-base sheets is Carnegie, Pa. A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:	
½-in. & smaller diam.	15
⅝-in. & ⅞-in.	18.5
1-in. and larger	17.5
Longer than 6 in.:	
All diams.	14
Lag bolts, all diams.:	
6 in. and shorter	23
over 6 in. long	21
Ribbed Necked Carriage	18.5
Blank	34
Plow	34
Step, Elevator, Tap, and Sleigh Shoe	21
Tire bolts	12
Boiler & Fitting-Up bolts	31

NUTS

	Reg.	Hvy.
H.P. & C.P. Square:		
½-in. & smaller	15	15
⅝-in. & ⅞-in.	12	6.5
1-in.-1½-in.	9	1
1⅛-in. & larger	7.5	1
H.P. Hex.:		
½-in. & smaller	26	22
⅝-in. & ⅞-in.	16.5	6.5
1-in.-1½-in.	12	2
1⅛-in. & larger	8.5	2
C.P. Hex.:		
½-in. & smaller	26	22
⅝-in. & ⅞-in.	23	17.5
1-in. & 1⅛-in.	19.5	12
1⅛-in. & larger	12	6.5

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or key quantities)	Reg.	Hvy.
½-in. & smaller	35	28.5
⅝-in. & ⅞-in.	29.5	22
1-in.-1½-in.	24	15
1⅛-in. & larger	13	8.5
Cut		Light
⅞-in. & smaller		35
½-in. to ⅞-in.		28.5
¾-in. to 1½-in.		26

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish	48 & 10
Plated finishes	31 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:	
¾-in. & smaller	42
⅞-in. through 1 in.	34
Longer than 6 in.:	
¾-in. & smaller	26
⅞-in. through 1 in.	4

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter	38
1 in. and smaller diam. x over 6 in.	26

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	35
¼-in. diam. & larger	16
N.F. thread, all diams.	10

RIVETS

F. o. b. midwestern plants Structural ½-in., larger 7.85c ½-in. under ..... 36 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ..List to list-plus-$1.

FLUORSPAR

Metallurgical grade, f. o. b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70%, $43; 60%, $40.

Imported, net ton, duty paid, metallurgical grade, $33-$35.

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE Inches Diam.	Length	Cents per lb
17.18-20	60-72	17.85
8 to 16	48-60-72	17.85
7	48-60	19.57
6	48-60	29.95
CARBON		
35-40	110	8.03
30	65-84-110	8.03
24	72 to 104	8.03
17 to 20	34-50	8.03

STAINLESS STEEL

Type	Sheets	C.R. Strip	Bars Wire Structurals
301	41.00	34.00	31.25
302	41.25	36.75	31.50
303	43.25	40.25	34.00
304	43.25	38.75	33.00
309	56.00	55.00	44.75
310	57.00	59.00	49.25
321	49.25	48.25	37.00
347	53.75	52.25	41.50
410	36.50	30.50	25.75
416	37.00	37.00	26.25
420	44.00	47.00	31.25
430	39.00	31.00	26.25
501	27.50	26.00	14.25
502	28.50	27.00	15.25

Balt., Types 301-347 sheet, quotes slight variations on Types 301-347.

Bridgeville, Pa., bars, wire, except 303 and 309 E2.

Brackenridge, Pa., sheets A4 sheets & strip U4.

Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502, A10.

Carnegie, Pa., sheets and strip except Types 303, 416, 501 & 502 and 0.25c lower on Types 302, 304, 321, 347; 0.50c lower on Types 309 and 316 S18.

Cleveland, strip A7.

Detroit, strip M1 quotes 34.00 on Type 301; 36.50, 302; 38.50, 304; 58.50, 316; 52.00, 347; 30.50, 410; 31.00, 430.

Dunkirk, N. Y., bars, wire A4 quotes slight variations on Types 301-347.

Duquesne, Pa., bars U5.

Fort Wayne, Ind., bars and wire, except Types 501 & 502 J6 quotes slight variations on Types 301-347.

Gary, Ind., sheets except Type 416 U5.

Harrison, N. J., strip and wire C18.

Massillon, O., all items, R2.

McKeesport, Pa., strip, Type 410; bars & wire, Types 410 through 430 and 31.25c on Type 302, 33.75c on 303, 32.75c on 304, 48.75c on 316, 36.75c on 321, 41.25c on 347 F2.

McKeesport, Pa., bars, sheets except Type 416 U5.

Middletown, O., sheets and strip except Types 303, 416, 420, 501 and 502 A10.

Midland, sheets & Strip C18.

Munhall, Pa., bars U5.

Pittsburgh, sheets C18.

Reading, Pa., strip except 34.25c on Type 301 and 56.00c on 309; bars, except 31.50c on Type 301 and 45.25c on 309 C4.

Sharon, Pa., strip, except Types 303, 309, 416, 501, 502 and 34.25c on Type 301 S3.

So. Chicago, Ill., bars & structurals U5.

Syracuse, N. Y., bars, wire & structurals C18.

Titusville, Pa., bars, U4.

Wallingford, Conn., strip, W2 quotes 0.25c higher.

Washington, Pa., bars, sheets & strip, except 0.25c higher on Type 301 J3.

Washington, Pa., Types 301 through 347 sheets & strip except 303, 309; 316 sheets 62.00, strip 64.00 W4.

Watervliet, N. Y., structurals & bars A4 quotes slight variations on Types 301-347.

Waukegan, bars & wire A7.

West Leechburg, Pa., strip, A4 quotes slight variations on Types 301-347.

Youngstown, strip, except Types 303, 309, 316, 416, 501 and 502 and 34.25 on Type 301.

COAL CHEMICALS

Spot, cents per gallon, ovens

Pure benzol	30.00-35.00
Toluol, one deg.	26.00-33.00
Industrial xylol	25.00-33.50

Per ton bulk, ovens

Sulphate of ammonia	$32-$45

Cents per pound, ovens

Phenol, 40 (carlots, non-returnable drums)	17.25

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

Sponge iron	Cents
98+% Fe, carlots	17.00
Swedish, c.i.f. New York, in bags	8.85-9.95
Electrolytic Iron:	
Annealed, 99.5% Fe	42.50
Unannealed, 99 + % Fe	36.50
Unannealed, 99 + % Fe (minus 325 mesh)	58.50
Powder Flakes	48.50
Carbonyl Iron:	
97.9-99.8%, size 5 to 10 microns	83.00-148.00
Aluminum:	
Carlots, freight allowed	29.50
Atomized, 500 lb drums, freight allowed	33.50
Antimony	75.85
Brass, 10-ton lots	30.00-33.25
Bronze, 10-ton lots	51.25-60.00
Phosphor-Copper, 10 ton lots	50.00
Copper:	
Electrolytic	37.25-46.25
Reduced	33.75-37.00
Lead	25.50
Magnesium	75.00-85.00
Manganese:	
Minus 100-mesh	57.00
Minus 35 mesh	52.00
Minus 200 mesh	62.00
Nickel unannealed	86.00
Nickel-Silver, 10-ton lots	45.00
Silicon	38.50
Solder (plus cost of metal)	8.50
Stainless Steel, 302	83.00
Zinc, 10-ton lots	23.00-30.50

Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh, freight allowed:	
1000 lb and over	6.00
Less than 1000 lb	6.15
98.5% minus 65 mesh, freight allowed:	
1000 lb and over	4.15
Less than 1000 lb	4.25
Molybdenum:	
99.9%, minus 200 mesh	3.25
Chromium, electrolytic 99% Cr min.	3.50

METALLURGICAL COKE

Price per net ton

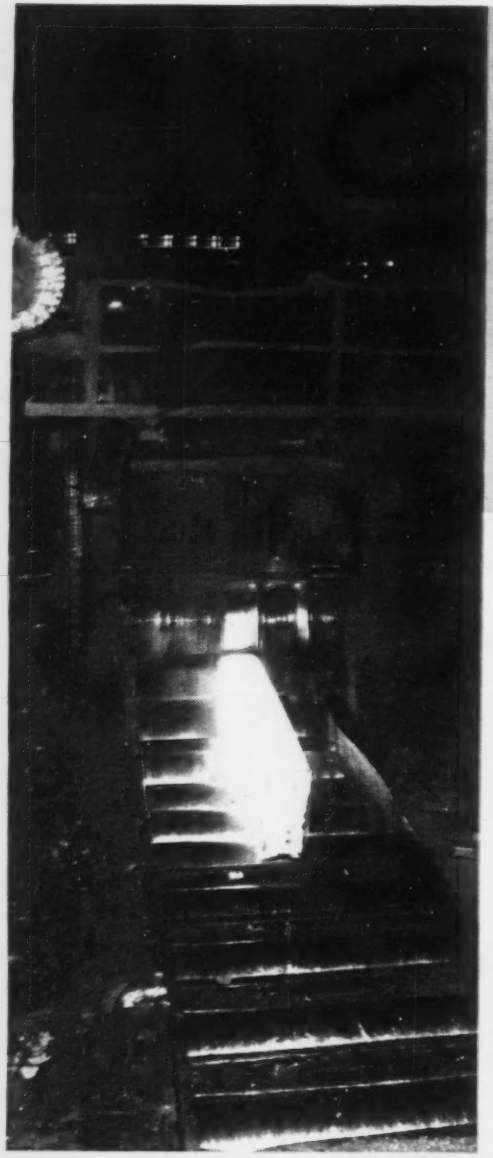
BEEHIVE OVENS

Connellsvill, fur.	$14.50-15.00
Connellsvill, fdry.	17.00-18.00
New River foundry	21.30
Wise county, foundry	15.95
Wise county, furnace	15.20

OVEN FOUNDRY COKE

Kearny, N. J., ovens	$22.75
Everett, Mass., ovens	
New England, del.	*24.80
Chicago ovens	23.00
Chicago, del.	24.40
Terre Haute, ovens	22.50
Milwaukee, ovens	23.75
Indianapolis, ovens	22.75
Chicago, del.	26.42
Cincinnati, del.	25.85
Detroit, del.	26.85
Ironton, O., ovens	22.50
Cincinnati, del.	25.12
Painesville, O., ovens	24.00
Cleveland, del.	25.82
Erie, Pa., ovens	23.50
Birmingham, ovens	20.30
Birmingham, del.	21.69
Philadelphia, ovens	22.70
Nevillelsland, Pa., ovens	23.00
Swedeland, Pa., ovens	22.60
St. Louis, ovens	
St. Louis, del.	25.40
Portsmouth, O., oven	22.50
Cincinnati, del.	25.12
Detroit, ovens	24.00
Detroit, del.	25.00
Buffalo, del.	26.89
Flint, del.	26.59
Pontiac, del.	25.47
Saginaw, del.	26.92

* Or within $4.15 freight zone from works.



STEEL MILLS NEED SCRAP BECAUSE YOU NEED STEEL

The lack of scrap at steel mills is aggravating still further the shortages you are already enduring in steel supply. This scrap may be cluttering your property—adding to your cost of doing business. It can help increase steel supply, if you move it now. Call your dealer and profit two ways. Your scrap is worth cash today and it will enable the mills to produce more steel.

CONTINENTAL STEEL

CONTINENTAL STEEL CORPORATION

GENERAL OFFICES • KOKOMO, INDIANA

PRODUCERS OF STEEL SHEETS, including Continental GALVANIZED, COPPER-STEEL Galvanized, KONIK steel sheets Galvanized, UNIFORM SPANGLE Galvanized, DULL COAT, Continental GALVANNEALED, ELECTRICAL, Hot Rolled Pickled, and many styles of Formed Roofing.

ALSO, Manufacturer's Wire in many steel, shapes, tempers, and finishes, Continental Chain Link Fence, Nails, and other steel products.

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Galv. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§		Carbon	Floor
New York (city)	6.27	7.29	8.44	6.59	...	6.42	7.29	9.25	6.40	6.58	8.04
New York(c'try)	5.97	6.99	8.14	6.29	...	6.12	6.99	8.95	6.10	6.28	7.74
Boston (city)	6.40	7.20	8.49	6.35	...	6.25	7.04	9.25	6.40	6.98	7.88
Boston (c'try)	6.20	7.00	8.29	6.15	...	6.05	6.84	9.05	6.20	6.78	7.68
Phila. (city)	6.15	7.05	8.25	6.35	...	6.30	7.11	8.90	6.15	6.30	7.40
Phila. (c'try)	5.90	6.80	8.00	6.10	...	6.05	6.86	8.65	5.90	6.05	7.15
Balt. (city)	5.80	7.04	8.27	6.24	...	6.24	7.09	...	6.34	6.00	7.64
Balt. (c'try)	5.60	6.84	8.07	6.04	...	6.04	6.89	...	6.14	5.80	7.44
Norfolk, Va.	6.50	...	...	6.70	...	6.55	7.70	...	6.60	6.50	8.00
Richmond, Va.	5.90	...	8.10	6.10	...	6.10	6.90	...	6.30	6.00	7.80
Wash. (w'hse)	6.02	7.26	8.49	6.46	...	6.46	7.26	...	6.56	6.22	7.86
Buffalo (del.)	5.80	6.60	8.29	6.06	...	5.80	6.65	10.65††§	6.00	6.25	7.55
Buffalo (w'hse)	5.60	6.40	8.09	5.86	...	5.60	6.45	10.45††§	5.80	6.05	7.35
Pitts. (w'hse)	5.60	6.40*	7.75	5.65-5.95	6.90	5.55	6.40	10.10††	5.70	5.75	7.00
Detroit (w'hse)	5.45-5.78	6.53-6.80	7.99	5.94-5.95	7.75	5.84	6.56	8.91	6.09	6.19-6.35	7.28
Cleveland (del.)	5.80	6.60	8.30	5.89	7.10	5.77	6.60-6.70	8.91	10.02	6.12	7.32
Cleve. (w'hse)	5.60	6.40	8.10	5.69	6.90	5.57	6.40-6.50	8.71	5.82	5.92	7.12
Cincin. (city)	6.02	6.59	7.34	5.95	...	5.95	6.51	...	6.24	6.34	7.50
Chicago (city)	5.80	6.60	7.95	5.75	...	5.75	6.50	10.30	5.90	6.00	7.20
Chicago (w'hse)	5.60	6.40	7.75	5.55	...	5.55	6.30	10.10	5.70	5.80	7.00
Milwaukee (city)	5.94	6.74	8.09	5.89	...	5.89	6.74	10.44	6.04	6.14	7.34
Milwau. (c'try)	5.74	6.54	7.89	5.69	...	5.69	6.54	10.24	5.84	5.94	7.14
St. Louis (del.)	6.05	6.85	8.20	6.00	...	6.00	6.85	10.55	6.23	6.33	7.53
St. L. (w'hse)	5.85	6.65	8.00	5.80	...	5.80	6.65	10.35	6.03	6.13	7.33
Kans. City(city)	6.40	7.20	8.40	6.35	...	6.35	7.20	...	6.50	6.60	7.80
KansCity(w'hse)	6.20	7.00	8.20	6.15	...	6.15	7.00	...	6.30	6.40	7.60
Birm'hm (city)	5.75	6.55	6.90‡	5.70	...	5.70	7.53	...	5.85	6.10	8.25
Birm'hm(w'hse)	5.60	6.40	6.75‡	5.55	...	5.55	7.53	...	5.70	5.95	8.23
Los Ang. (city)	6.55	8.10	9.05‡	6.60	8.90	6.55	7.75	...	6.55	6.60	9.20
L. A. (w'hse)	6.35	7.90	8.85‡	6.40	8.70	6.35	7.55	...	6.35	6.40	8.70
San Francisco	6.65	7.80‡	8.90‡	6.60	...	6.45	8.20	...	6.45	6.50	8.60
Seattle-Tacoma	7.05	8.60‡	9.20‡	7.30	...	6.75	9.10	11.15	6.65	6.75	8.80

Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; ²—500 to 1499 lb; ³—450 to 1499 lb; ⁴—3500 lb and over; ⁵—1000 to 1999 lb.

ORES

Lake Superior Iron Ore

Gross ton, 51½% (natural), lower lake ports.

After adjustment for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in applicable lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

Old range bessemer	$8.70
Old range nonbessemer	8.55
Mesabi bessemer	8.45
Mesabi nonbessemer	8.30
High phosphorus	8.30

Eastern Local Ore

Cents per unit, del. E. Pa.

Foundry and basic 56-62% concentrates contract	17.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	17.00
Long-term contract	15.00
North African hematites	17.00
Brazilian iron ore, 68-69%	24.00-25.00

Tungsten Ore

Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$65.00
Domestic scheelite, mines	65.00

Manganese Ore

Manganese, 48% nearby, $1.18-$1.22 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 79.8-81.8c.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African	
48% 2.8:1	$32.50
48% 3:1	35.00-36.00
48% no ratio	26.00
South African Transvaal	
44% no ratio	$27.00-28.00
48% no ratio	34.00-35.00
Brazilian	
44% 2.5:1 lump	$32.00
Rhodesian	
45% no ratio	$20.00-21.00
48% no ratio	26.00
48% 3:1 lump	35.00-36.00
Domestic—rail nearest seller	
48% 3:1	$39.00

Molybdenum

Sulphide concentrates per lb. molybdenum content, mines	$1.00

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 21.75c per lb of contained Cr, c.l., packed 22.65c, ton lot 23.80c, less ton 23.20c. Delivered Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%.) Contract, carload, lump, bulk, max. 0.03% C 33.60c per lb of contained Cr, 0.04% C 31.50c, 0.06% C 30.50c, 0.10% C 30.00c, 0.15% C 29.75c, 0.20% C 29.50c, 0.50% C 29.25c, 1% C 29.00c, 1.50% C 28.85c, 2% C 28.75c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered Spot, add 0.25c.

Foundry Ferrochrome, High Carbon: (Cr 62-66%, C 5-7%.) Contract, c.l. 8 M x D, bulk, 23.25c per lb of contained Cr, C.l., packed 24.15c, ton 23.50c, less ton 27.25c. Delivered Spot, add 0.25c.

Foundry Ferrochrome, Low Carbon: (Cr 50-54%, Si 2.8-32%, C 1.25% max.) Contract, carload, packed, 8 M x D, 16.35c per lb of alloy; ton lot 17.2c, less ton lot, 18.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max.) Contract, carload, lump, 4" x down and 2" x down, bulk, 21.75c per lb of contained chromium plus 12.4c per pound of contained silicon; 1" x down, bulk 21.90c per pound of contained chromium plus 12.60c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Ferrochrome Silicon, No. 2: (Cr 36-39%, Si 36-39%, Al 7-9%, C 0.05% max.) 21.75c per lb of contained silicon plus 12.4c per lb of contained silicon plus aluminum, 3" x down, delivered.

Chromium Metal: (Min. 97% Cr and 1% Fe) Contract carload, 1" x D; packed, max 0.50% C grade, $1.08 per lb of contained chromium ton lot $1.10, less ton $1.12. Delivered. Spot add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.00c per lb of contained Si; packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.40c per lb of contained Si, carload packed 14.0c, ton lot 15.45c, less ton 17.1c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.3c per lb of contained Si, carload packed 15.6c, ton lot 16.75c, less ton 18.0c. Delivered. Spot, add 0.8c.

Note: Current prices on zirconium, calcium and briquetted alloys appeared on page 159, Sept. 17 issue; manganese, titanium and "other" ferroalloys, page 151, Sept. 24. Refractories prices were published on page 159, Sept. 24.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.) Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 17.5c per lb of contained Si, carload packed 18.7c, ton lot 19.65c, less ton 20.7c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min. 97% Si and 1% max. Fe.) C.l. lump, bulk, regular 20.0c per lb of Si, c.l. packed 21.2c, ton lot 22.1c, less ton 23.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe.) Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.90c per lb of alloy, ton lots packed 11.30c, 200 to 1999 lb 11.65c, smaller lots 12.15c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12% max., C 3-3.5% max.). Contract, any quantity, $3.10 per lb of contained V. Delivered, Spot, add 10c. **Crucible-Special Grades** (V 36-55%, Si 2-3.5% max. C 0.5-1% max.), $3.20. **Primos and High Speed Grades** (V 35-55%, Si 1.50% max., C 0.20% max.) $3.30.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min. B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.8%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

TUNGSTEN ALLOYS*

Ferrotungsten: (70-80%), 10,000 lb W or more, $5.00 per lb of contained W; 2000 lb W to 10,000 lb W, $5.10; less than 2000 lb W, $5.22.

Tungsten Powder: Carbon Reduced; (W 98.8% min.) 1000 lb or more, $6.00 per lb of contained W; less than 1000 lb W, $6.15.

**Government ceiling prices, effective May 7, 1951, f.o.b. Niagara Falls, N. Y., basis.*

CEILING PRICES, IRON AND STEEL SCRAP

Prices as set forth in Office of Price Stabilization ceiling price regulation No. 5, as amended Apr. 19, 1951

STEELMAKING SCRAP COMPOSITE

Sept. 27	$44.00
Sept. 20	44.00
July 1951	44.00
Aug. 1950	40.00
Aug. 1946	19.17

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

Basing point ceiling prices per gross ton from which maximum shipping prices are computed on scrap of dealer and industrial origin; and from which ceiling on-line and ceiling delivered prices are computed on scrap of railroad origin.

No. 1 Heavy Melting Steel (Grade) 1

Basing Point	Dealer, Industrial	Railroad
Alabama City, Ala.	$39.00	$41.00
Ashland, Ky.	42.00	44.00
Atlanta, Ga.	39.00	41.00
Bethlehem, Pa.	42.00	44.00
Birmingham, Ala.	39.00	41.00
Brackenridge, Pa.	44.00	46.00
Buffalo, N. Y.	43.00	45.00
Butler, Pa.	44.00	46.00
Canton, O.	44.00	46.00
Chicago, Ill.	42.50	44.50
Cincinnati, O.	43.00	45.00
Claymont, Del.	42.50	44.50
Cleveland, O.	43.00	45.00
Coatesville, Pa.	42.50	44.50
Conshohocken, Pa.	42.50	44.50
Detroit, Mich.	41.15	43.15
Duluth, Minn.	40.00	42.00
Harrisburg, Pa.	42.50	44.50
Houston, Tex.	37.00	39.00
Johnstown, Pa.	44.00	46.00
Kansas City, Mo.	39.50	41.50
Kokomo, Ind.	42.00	44.00
Los Angeles	35.00	37.00
Middletown, O.	43.00	45.00
Midland, Pa.	44.00	46.00
Minnequa, Colo.	38.00	40.00
Monessen, Pa.	44.00	46.00
Phoenixville, Pa.	42.50	44.50
Pittsburg, Calif.	35.00	37.00
Pittsburgh, Pa.	44.00	46.00
Portland, Oreg.	35.00	37.00
Portsmouth, O.	42.00	44.00
St. Louis, Mo.	41.00	43.00
San Francisco	35.00	37.00
Seattle, Wash.	35.00	37.00
Sharon, Pa.	44.00	46.00
Sparrows Point, Md.	42.00	44.00
Steubenville, O.	44.00	46.00
Warren, O.	44.00	46.00
Weirton, W. Va.	44.00	46.00
Youngstown, O.	44.00	46.00

Differentials from Base

Differentials per gross ton for other grades of dealer and industrial scrap:

O-H and Blast Furnace Grades

2. No. 2 Heavy Melting... —$2.00
3. No. 1 Busheling ..... Base
4. No. 1 Bundles ..... Base
5. No. 2 Bundles ..... — 3.00
6. Machine Shop Turnings —10.00
7. Mixed Borings & Short Turnings ..... — 6.00
8. Shoveling Turnings .... — 6.00
9. No. 2 Busheling ..... — 4.00
10. Cast Iron Borings ..... — 6.00

Elec. Furnace and Fdry. Grades

11. Billet, Bloom & Forge Crops ..... + 7.50
12. Bar Crops & Plate .... + 5.00
13. Cast Steel ..... + 5.00
14. Punchings & Plate Scrap + 2.00
15. Electric Furnace Bundles + 2.00
Cut Structurals & Plate:
16. 3 feet and under..... + 3.00
17. 2 feet and under..... + 5.00
18. 1 foot and under..... + 6.00
19. Briquetted Cast Iron Borings ..... Base
Foundry Steel:
20. 2 feet and under .... + 2.00
21. 1 foot and under .... + 4.00
22. Springs and Crankshafts + 1.00
23. Alloy Free turnings .. — 3.00
24. Heavy Turnings ..... — 1.00

Special Grades

25. Briquetted Turnings .. Base
26. No. 1 Chemical Borings — 3.00
27. No. 2 Chemical Borings — 4.00
28. Wrought Iron ..... +10.00
29. Shafting ..... +10.00

Restrictions on Use

(1) Prices for Grades 11 and 23 may be charged only when shipped to a consumer directly from an industrial producer; otherwise ceiling prices shall not exceed prices established for Grades 12 and 8, respectively.
(2) Prices established for Grades 26 and 27 may be charged only when sold for use for chemical or annealing purposes, and in the case of Grade 27, for briquetting and direct charge into an electric furnace; otherwise ceiling prices shall not exceed price established for Grade 10.
(3) Prices established for Grade 28 may be charged only when sold to a producer of wrought iron; otherwise ceiling price shall not exceed ceiling price for corresponding grade of basic open-hearth.
(4) Premiums for Grades 11-18, 20 and 21 may be charged only when sold for use in electric and open-hearth furnaces or foundries.
(5) Prices for Grade 29 may be charged only when sold for forging or rerolling purpose.

Special Pricing Provisions

(1) Sellers of Grades 26 and 27 may make an extra charge of $1.50 per ton for loading in box cars, or 75 cents per ton for covering gondola cars with a weather-resistant covering.
(2) Ceiling price of pit scrap, ladle scrap, salamander scrap, skulls, skimmings or scrap recovered from slag dumps and prepared to charging box size, shall be computed by deducting from the price of No. 1 heavy melting steel of dealer and industrial origin, the following amounts: Where iron content is 85% and over, $6; 75% and over, $10; less than 75%, $12.
(3) Ceiling price of any inferior grade of scrap not listed shall not exceed the price of No. 1 heavy melting steel less $15.

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 railroad heavy melting steel) for other grades of railroad steel scrap.

2. No. 2 Heavy melting Steel ..... —$2.00
3. No. 2 Steel Wheels ... Base
4. Hollow Bored Axles and loco. axles with keyways between the wheelseats. Base
5. No. 1 Busheling ..... — 3.50
6. No. 1 Turnings ..... — 3.00
7. No. 2 Turnings, Drillings & Borings .... —12.00
8. No. 2 Cast Steel and uncut wheelcenters ..... — 6.00
9. Uncut Frogs, switches Base
10. Flues, Tubes & Pipes .. — 8.00
11. Structural, Wrought Iron and/or steel, uncut ... — 6.00
12. Destroyed Steel Cars .. — 8.00
13. No. 1 Sheet Scrap ..... — 9.50
14. Scrap Rails, Random Lengths ..... + 2.00
15. Rerolling Rails ..... + 7.00
Cut Rails:
16. 3 feet and under .... + 5.00
17. 2 feet and under .... + 6.00
18. 18 inches and under .. + 8.00
19. Cast Steel, No. 1 .... + 3.00
20. Uncut Tires ..... + 2.00
21. Cut Tires ..... + 5.00
Bolsters & Side Frames:
22. Uncut ..... Base
23. Cut ..... + 3.00
24. Angle, Splice Bars & Tie Plates ..... + 5.00
25. Solid Steel Axles ..... +12.00
26. Steel Wheels, No. 3 oversize ..... Base
27. Steel Wheels, No. 3 .... + 5.00
28. Spring Steel ..... + 5.00
29. Couplers & Knuckles .. + 5.00
30. Wrought Iron ..... + 8.00
31. Fireboxes ..... — 8.00
32. Boilers ..... — 6.00
33. No. 2 Sheet Scrap .... —13.00
34. Carsides, Doors, Car Ends, cut apart ..... — 6.00

Restrictions on Use

(1) Price established for Grade 15 may be charged only when purchased and sold for rerolling uses; otherwise, ceiling shall not exceed that for Grade 14.
(2) Price established for Grade 30 may be charged only when sold to a producer of wrought iron; otherwise, ceiling shall not exceed that for No. 1 heavy melting steel.
(3) Price for Grade 25 may be charged only when sold for rerolling and forging purposes; otherwise ceiling shall not exceed that for base grade (No. 1.)

CAST IRON SCRAP

Ceiling price per gross ton for following grades shall be f.o.b. shipping point:

Cast Iron:

1. No. 1 (Cupola) $49.00
2. No. 2 (Charging Box) 47.00
3. No. 3 (Hvy. Breakable) 45.00
4. No. 4 (Burnt Cast) .. 41.00
5. Cast Iron Brake Shoes.. 41.00
6. Stove Plate 46.00
7. Clean Auto Cast 52.00
8. Unstripped Motor Blocks 43.00
9. Wheels, No. 1 ..... 55.00
10. Malleable 55.00
11. Drop Broken Machinery. 52.00

Restrictions on Use

(1) Ceiling shipping point price which a basic open-hearth consumer may pay for No. 1 cast iron, clean auto cast, malleable or drop broken machinery cast shall be ceiling price for No. 3 cast iron.
(2) Ceiling shipping point price which any foundry other than a malleable iron producer may pay for Grade 30 shall be ceiling price for No. 1 cast iron.

Preparation Charges

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of dealer or industrial origin authorized by OPS are:

(1) For preparing into Grades No. 1, No. 2 or No. 3, $8.
(2) For hydraulically compressing Grade No. 4, $6 per ton; Grade No. 5, $8.
(3) For crushing Grade No. 6, $3.
(4) For preparing into Grade No. 25, $6.
(5) For preparing into Grade No. 19, $6.
(6) For preparing into Grades No. 12, No. 13, No. 14, No. 16, or No. 20, $10.
(7) For preparing into Grade No. 17 or Grade No. 21, $11.
(8) For preparing into Grade No. 18 or Grade No. 20, $12.
(9) For hydraulically compressing Grade No. 15, $8.
(10) For preparing into Grade No. 28, $10.

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of railroad origin shall be:

(1) For preparing into Grade No. 1 and Grade No. 2, $8.
(2) For hydraulically compressing Grade No. 13, $6.
(3) For preparing into Grade No. 16, $4.
(4) For preparing into Grade No. 17, $5.
(5) For preparing into Grade No. 18, $7.
(6) For preparing into Grade No. 21, $4.
(7) For preparing into Grade No. 23, $4.

Ceiling fees per gross ton which may be charged for intransit preparation of cast iron are limited to:

(1) For preparing Grade No. 8 into grade No. 7, $9.
(2) For preparing Grade No. 3 into Grade No. 11, $7.
(3) For preparing Grade No. 3 into Grade No. 1, $4.

Whenever scrap has arrived at its point of delivery and consumer engages a dealer to prepare such scrap, no fee may be charged for such services unless consumer obtains prior written OPS approval.

Commissions

No commission shall be payable to a broker in excess of $1.

Unprepared Scrap

For unprepared scrap, other than materials suitable for hydraulic compression, ceiling basing point prices shall be $8 per ton beneath ceiling of the prepared base grades.

For unprepared material which when compressed constitutes No. 1 bundles, ceiling basing point price shall be $6 per ton beneath ceiling for No. 1 bundles; or when compressed constitutes No. 2 bundles ceiling basing point price shall be $8 beneath ceiling basing point price for No. 2 bundles.

Premiums for Alloy Content

No premium may be charged for alloy content except: $1.25 per ton for each 0.25% of nickel where scrap contains not less than 1% and not over 5.25% nickel; $2 per ton for scrap containing not less than 0.15 per cent molybdenum and $3 for scrap containing not less than 0.65% molybdenum; for scrap containing not less than 10% manganese, $4 for scrap in sizes larger than 12 x 24 x 8 in., and $14 for scrap cut in that size or smaller (applicable only if scrap is sold for electric furnace uses or on NPA allocation); $1 for scrap conforming to SAE 52100.

Switching Charges

Switching charges to be deducted from basing point prices of dealer, industrial and nonoperating railroad scrap, to determine ceiling shipping point prices for scrap originating in basing points are per gross ton:

Alabama City, Ala., 43c; Ashland, Ky., 47c; Atlanta, 54c; Bethlehem, Pa., 50c; Birmingham, 50c; Brackenridge, Pa., 53c; Buffalo, 83c; Butler, Pa., 65c.
Canton, O., 51c; Chicago (including Gary, Ind.), $1.34; Cincinnati (including Newport, Ky.), 65c; Claymont, Del. (including Chester, Pa.), 79c; Cleveland, 76c.
Coatesville, Pa., 56c; Conshohocken, Pa., 20c.
Detroit, 95c; Duluth, Minn., 50c.
Harrisburg, Pa., 51c; Houston, Tex., 57c.
Johnstown, Pa., 75c.
Kansas City, Mo., 78c; Kokomo, Ind., 51c.
Middletown, O., 26c; Midland, Pa., 75c; Minnequa, Colo., 33c; Monessen, Pa., 51c.
Phoenixville, Pa., 51c; Pittsburg, Calif., 65c; Pittsburgh (including Bessemer, Homestead, Duquesne, Munhall), 99c; Portland, Oreg., 52c; Portsmouth, O., 51c.
St. Louis (including Federal, Granite City, E. St. Louis, Madison, Ill.), 51c; San Francisco (including Mo. San Francisco, Niles, Oakland), 66c; Seattle, 59c; Sharon, Pa., 75c; Sparrows Point, Md., 20c; Steubenville, O., 51c.
Warren, Pa., 75c; Weirton, W. Va., 70c.
Youngstown, 75c.

HAMILTON, ONT.
(Delivered Prices)

Heavy Melt.	$35.00
No. 1 Bundles	35.00
No. 2 Bundles	34.00
Mechanical Bundles	33.00
Mixed Steel Scrap	31.00
Mixed Borings, Turnings	28.00
Rails, Remelting	35.00
Rails, Rerolling	38.00
Busheling	29.50
Bushelings new factory, prep'd.	33.00
Bushelings new factory, unprep'd.	28.00
Short Steel Turnings	28.00
Cast Iron Grades*	
No. 1 Machinery Cast.	58.00-60.00

* F.o.b. shipping point.

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The Metal Market

Government takes steps to assure adequate supplies of nonferrous metals to sustain production of defense materiel. Aluminum rivet makers get supplemental allotments

SHORTAGES of nonferrous metals, aggravated by the recent strike of workers at copper, lead and zinc producing properties, are critical, threatening curtailment of an important segment of defense materiel production.

The government is taking steps to alleviate the situation requiring larger set-asides for war materiel and less for consumer goods. To expedite production of military aircraft during first quarter 1952, Defense Production Administration issued supplemental allotments for 1 million pounds of aluminum to four aluminum rivet manufacturers for use in fourth quarter this year. Original allotment to them for fourth quarter was 1.5 million pounds.

An estimated 2.8 million pounds of aluminum rivets are needed for first-quarter military aircraft production. Total fourth-quarter CMP allotment to rivet makers will cover 2.5 million pounds. The remainder of the first-quarter aircraft rivet requirements will be supplied from early production in first quarter.

The supplemental allotment was made from DPA's reserve of controlled materials set aside for hardship cases.

A power shortage in the Pacific northwest seriously threatens aluminum production.

Aids Producers—The government has assured a further increase in domestic copper production for stockpiling and other defense needs by reaching agreements on two projects. Defense Materials Procurement Agency will advance $60,000 for working capital to North Butte Mining Co., Butte, Mont., for expansion of its facilities at the Granite Mountain mine. The company has a leaching operation at the site which will be enlarged to produce about 7 million pounds of cement copper annually.

An agreement with Copper Cities Mining Co., Miami, Ariz., will provide 22,500 tons a year. The copper will come from ore mined at the company's Gila county ore body near that city. The agreement calls for Copper Cities to undertake a $15.2 million expansion program for additional equipment to mine and treat the ore. DMPA agrees to buy at 23.00c a pound up to 170 million pounds of the first 192.5 million pounds produced by the new facilities, providing the company cannot sell it to other purchasers in the United States at a higher price. The new facilities, which will have an annual capacity of 22,500 tons, are expected to go into production in October, 1954.

Galvanizing Operations Cut

A letter of intent was signed with the Volcan Mines Co., Lima, Peru, which will assure the United States for a three-year period the entire output of the company's rich zinc deposit located in the mountains of Ticlio, Peru.

The proposed contract calls for the company to build a $750,000 concentrating mill with a monthly capacity of 1500 tons of 60 per cent zinc concentrate at the site of the mine. The entire output will be shipped to smelters in the United States where it will be processed into about 765 tons of slab zinc a month.

The government agrees to purchase 50 per cent of the slab zinc, up to a maximum of 380 tons a month for three years, or a total of 13,680 tons, at 17.5c a pound, f.o.b. smelter. Remainder of the output will be sold commercially in the United States by the company at the same price.

The concentrating mill is scheduled for completion about Jan. 1, 1953.

While this agreement is important from the viewpoint of this nation's future zinc needs, it is of no value in correcting the present acute shortage. Galvanizing operations will be curtailed sharply in October and for several subsequent months. Recent work stoppages caused a loss of about 17,000 tons of zinc in September and will further reduce October production by at least 12,000 tons.

Galvanized sheet producers must determine the amount by which anticipated production for each month will fall below directed production for that month. After deducting from the total purchase orders for galvanized sheets for a calendar month the orders received on NPA directives, military and Atomic Energy Commission orders, producers will divide the resultant shortage proportionately among warehouse orders as a class, further converters as a class, and all other orders as a class.

Lead Supplies Tighten

Lead supplies are much tighter as a result of the late summer strikes. Lead allocation authorizations to consumers for October shipment will be smaller than those originally planned for September. Requests for metal are several times the tonnage that will be available.

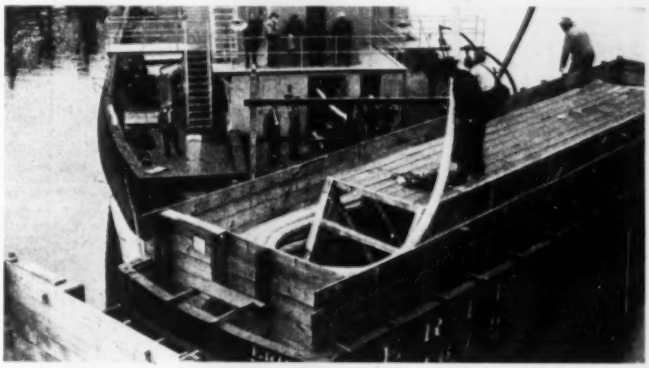
To supplement domestic supplies, government officials are negotiating with the Canadian government on means of increasing the flow of lead to the United States. Stocks of refined lead dropped to only 24,997 tons at the end of August, the lowest since September, 1948. With production declining to only 31,756 tons from 44,864 tons in July, domestic shipments were limited to 40,252 tons.

Tin Restriction Extended

Current limitations on the use of pig tin have been extended to succeeding calendar quarters. In the former order, M-8, restrictions were limited to the third quarter only. All other provisions of M-8 remain in effect.

Future tin prices will be determined by decisions reached in meetings between RFC officials and Bolivian interests in Washington and those being held in Rome by the International Tin Study Group.

World tin production in July is estimated at 13,600 tons compared with 13,700 tons in June.



VOLTS UNDER THE SEA: Shown being pulled aboard the cable laying ship is one of the world's largest underwater cables. Made by Okonite Co., Passaic, N. J., for Bonneville Power Administration, the cable supplies electric power at 25,000 volts to the San Juan Island Group, Washington. Used in producing the cable were 111,200 pounds or 1400 miles of copper wire and 354,500 pounds or 400 miles of Bethanized steel armor wire. The total length of the completed cable is approximately 7½ miles and the total weight approximately 750,000 pounds

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 24.50c, Conn. Valley; Lake 24.62½c, delivered.

Brass Ingots: 85-5-5-5 (No. 115) 27.25c; 88-10-2 (No. 215) 38.50c; 80-10-10 (No. 305) 32.25c; No. 1 yellow (No. 405) 23.25c.

Zinc: Prime western 17.50c; brass special 17.75c; intermediate 18.00c, East St. Louis; high grade 18.85c, delivered.

Lead: Common 16.80c; chemical 16.90c; corroding 16.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 19.00c, pigs 18.00c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb. c.l. orders.

Secondary Aluminum: Piston alloys 20.50c; No. 12 foundry alloy (No. 2 grade) 19.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 18.00c; grade 2, 17.75c; grade 3, 17.25c; grade 4, 16.50c.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over 24.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt 103.00.

Antimony: American 99.99.8% and over but not meeting specifications below 42.00c; 99.8% and over (arsenic 0.03% max.; other impurities 0.1% max.) 42.50c; f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 56.50c; 25-lb pigs, 59.15c; "XX" nickel shot, 60.15c; "F" nickel shot or ingots, for addition to cast iron, 56.50c. Prices include import duty.

Mercury: Open market, spot, New York, $215-$221 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $1.56 per lb of alloy, f.o.b., Reading, Pa.

Cadmium: "Regular" straight or flat forms, $2.55 del.; special or patented shapes $2.80.

Cobalt: 97.99% $2.10 per lb for 500 lb (kegs); $2.12 per lb for 100 lb (case); $2.17 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York 90.16c per oz.

Platinum: $90-$93 per ounce from refineries.

Palladium: $24 per troy ounce.

Iridium: $200 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Ceiling prices, cents per pound, f.o.b. mill; effective Aug. 23, 1951)

Sheet: Copper 41.68; yellow brass 38.28; commercial bronze, 95% 41.61; 90% 41.13; red brass, 85% 40.14; 80% 39.67; best quality, 39.15; nickel silver, 18% 53.14; phosphor-bronze grade A, 5% 61.07.

Rod: Copper, hot-rolled 37.53; cold-drawn 38.78; yellow brass free cutting, 32.63; commercial bronze, 95% 41.30; 90% 40.82; red brass, 85% 39.83; 80% 39.36.

Seamless Tubing: Copper 41.72; yellow brass 41.28; commercial bronze, 90% 43.79; red brass, 85% 43.05.

Wire: Yellow brass 38.57; commercial bronze, 95% 41.50; 90% 41.42; red brass, 85% 40.43; 80% 39.96; best quality brass, 39.44.

(Base prices, effective Nov. 6, 1950)

Copper Wire: Bare, soft, f.o.b. eastern mills, c.l. 29.67-30.42; l.c.l. 29.17-30.92; 100,000 lb lots 28.545-30.295; weatherproof, f.o.b. eastern mills, c.l. 29.60-30.60, l.c.l. 30.10-31.10; 100,000 lb lots 29.35-30.35; magnet, del., 15,000 lb or more 34.50c, l.c.l. 35.25.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders)

Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range Inches	Widths or Diameters, In.; Inc.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	30.1	...	...
0.135-0.096	12-48	30.6	...	...
0.095-0.077	12-48	31.2	29.1	33.2
0.076-0.061	12-48	31.8	29.3	33.4
0.060-0.048	12-48	32.1	29.5	33.7
0.047-0.038	12-48	32.5	29.8	34.0
0.037-0.030	12-48	32.9	30.2	34.6
0.029-0.024	12-48	33.4	30.5	35.0
0.023-0.019	12-36	34.0	31.1	35.7
0.018-0.017	12-36	34.7	31.7	36.6
0.016-0.015	12-36	35.5	32.4	37.6
0.014	12-24	36.5	33.3	38.9
0.013-0.012	12-24	37.6	34.0	39.7
0.011	12-24	38.4	35.0	41.2
0.010-0.0095	12-24	39.4	36.1	42.7
0.009-0.0085	12-24	40.6	37.2	44.4
0.008-0.0075	12-24	41.9	38.4	46.1
0.007	12-18	43.3	39.7	48.2
0.006	12-18	44.8	41.0	52.8

* Lengths 72 to 180 inches. † Maximum diameter, 26 inches.

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or distance across flats	Round— R317-T4, 17S-T4	R317-T4	Hexagonal— 17S-T4
0.125	52.0	....	....
0.156-0.0188	44.0	....	....
0.219-0.313	41.5	....	....
0.375	40.0	46.0	48.0
0.406	40.0	....	....
0.438	40.0	46.0	48.0
0.469	40.0	....	....
0.500	40.0	46.0	48.0
0.531	40.0	....	....
0.563	40.0	....	45.0
0.594	40.0	....	....
0.625	40.0	43.5	45.0
0.688	40.0	....	45.0
0.750-1.000	39.0	41.0	42.5
1.063	39.0	....	41.0
1.125-1.500	37.5	39.5	41.0
1.563	37.0	....	....
1.625	36.5	....	39.5
1.688-2.000	36.5	....	....

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more $22.00 per cwt; add 50c cwt 10 sq ft to 140 sq ft. Pipe: Full coils $22.00 per cwt. Traps and bends: List prices plus 60%.

ZINC

Sheets, 24.50c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 23.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 23.50-24.50c; over 12-in., 23.50-24.50c.

"A" NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 77.00c. Strip, cold-rolled, 83.00c. Rods and shapes, 73.00c. Plates, 75.00c. Seamless tubes, 106.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 60.50c. Strip, cold-rolled 63.50c. Rods and shapes, 58.50c. Plates, 59.50c. Seamless tubes, 93.50c. Shot and blocks, 53.50c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.31 in. in diameter, less than 25 lb, 55.00-62.00c; 25 to 99 lb, 45.00-52.00c; 100 lb to 5000 lb, 41.00c.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, $6.

DAILY PRICE RECORD

1951	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Sept. 1-27	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
Aug. 1-31	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
Aug. Avg.	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
July Avg.	24.50	16.80	17.50	106.00	19.00	42.00	56.50	90.16
June Avg.	24.50	16.80	17.50	117.962	19.00	42.00	56.50	88.492
May Avg.	24.50	16.80	17.50	139.923	19.00	42.00	50.50	90.16
Apr. Avg.	24.50	16.80	17.50	143.735	19.00	42.00	50.50	90.16
Mar. Avg.	24.50	16.80	17.50	145.730	19.00	42.00	50.50	90.16
Feb. Avg.	24.50	16.80	17.50	182.716	19.00	42.00	50.50	90.16
Jan. Avg.	24.50	16.80	17.50	171.798	19.00	35.462	50.50	88.890

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked. Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

Plating Materials

Chromic Acid: 99.9% flakes, f.o.b. Philadelphia, carloads, 27.00c; 5 tons and over 27.50c; 1 to 5 tons, 28.00c; less than 1 ton 28.50c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat, rolled, 38.34c; oval 37.84c.

Nickel Anodes: Rolled oval, carbonized, carloads, 74.50c; 10,000 to 30,000 lb, 75.50c; 3000 to 10,000 lb, 76.50c, 500 to 3000 lb 77.50c; 100 to 500 lb, 79.50c; under 100 lb 82.50c; f.o.b. Cleveland.

Nickel Chloride: 36.50c in 100 lb bags; 34.50c in lots of 400 lb through 10,000 lb; 34.00c over 10,000 lb, f.o.b. Cleveland, freight allowed on 400 lb or more.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 77.7c; 100 or 350 lb drums only, 100 to 600 lb, 63.1c; 700 to 1900 lb, 60.6c; 2000 to 9900 lb, 58.9c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Tin Anodes: Bar, 1000 lb and over, $1.19; 500 to 999 lb, $1.195; 200 to 499 lb, $1.20; less than 200 lb, $1.215. Freight allowed east of Mississippi and north of Ohio and Potomac.

Zinc Cyanide: 100 lb drums, less than 10 drums 47.7c, 10 or more drums, 45.7c, f.o.b. Niagara Falls, N. Y.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb $1.0000; more than 2000 lb, 98.0c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Stannous Chloride (Anhydrous): In 400 lb bbl, 87.23c; 100 lb kegs 88.23c. Freight allowed.

Scrap Metals

Brass Mill Allowances

Ceiling prices in cents per pound for less than 20,000 lb, f.o.b. shipping point, effective June 26, 1951.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.50	21.50	20.75
Yellow Brass	19.125	18.875	17.875
Commercial Bronze			
95%	20.50	20.25	19.75
90%	20.50	20.25	19.75
Red Brass			
85%	20.25	20.00	19.625
80%	20.125	19.875	19.375
Muntz metal	18.125	17.875	17.375
Nickel silver, 10%	21.50	21.25	10.75
Phos. bronze, 5%	25.25	25.00	24.00

Copper Scrap Ceiling Prices

(Base prices, cents per pound, less than 40,000 lb f.o.b. point of shipment)

Group I: No. 1 copper 19.25; No. 2 copper wire and mixed heavy 17.75; light copper 16.50; No. 1 borings 19.25; No. 2 borings 17.75; refinery brass, 17.00 per lb of dry Cu content for 50 to 60 per cent material and 17.25 per lb for over 60 per cent material.

Group II: No. 1 soft red brass solids 19.50; No. 1 composition borings 19.25 per lb of Cu content plus 83 cents per lb of tin content; mixed brass borings 19.25 per pound of Cu content plus 78 cents per lb of tin content, unlined red car boxes 19.25; lined red car boxes 18.25; cocks and faucets 16.75; mixed brass screens 16.00; zincy bronze solids and borings 16.25.

Zinc Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment)

Unsweated zinc dross, 12.25c; new clippings and trimmings, 14.50c; engravers' and lithographers' plates, 14.50c; die cast slabs, min. 90% zinc 12.25c; old zinc scrap, 11.25c; forming and stamping dies, 11.25c; new die cast scrap, 10.75c; old zinc die cast radiator grills, 10.50c; old die cast scrap, 9.50c.

Lead Scrap Ceiling Prices

(F.o.b. point of shipment)

Battery lead plates, 17.00c per lb of lead and antimony content, less smelting charge of 2 cents per lb of material in lots 15,000 lb or more; less 2.25c in lots less than 15,000 lb. Used storage batteries (in boxes) drained of liquid, 6.50c for 15,000 lb or more; 6.40c for less than 15,000 lb. Soft lead scrap, hard lead scrap, battery slugs, cable lead scrap or lead content of lead-covered cable scrap, 15.25c per lb. In addition, brokerage commissions are permitted.

Aluminum Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment, less than 50000 lb)

Segregated plant scrap: 2s solids, copper free, 10.50; high grade borings and turnings, 8.50; No. 12 piston borings and turnings, 7.50; Mixed plant scrap: Copper-free solids, 10.00; dural type, 9.00; Obsolete scrap: Pure old cable, 10.00; sheet and sheet utensils, 7.25; old castings and forgings, 7.75; clean pistons, free of struts, 7.75; pistons with struts, 5.75.

Plates . . .

Plate Prices, Page 141

Boston—First quarter allocation of plates under CMP thus far is on a more realistic basis. However, defense requirements are mounting with tonnage for less important needs contracting. Six fleet oilers will be built from prototype design by Quincy yard, Bethlehem Steel Co.

Philadelphia — Squeeze in plates continues, with fourth quarter cancellations to date practically nil and mills accepting nothing for delivery beyond first quarter except highly rated defense requirements.

Pittsburgh—Considerable carryover is expected from month to month over remainder of this year. Anticipated cancellations on existing orders have failed to develop. NPA's request that carryovers be eliminated by Jan. 1 will necessitate shaving all fourth quarter orders.

Sheets, Strip . . .

Sheet and Strip Prices, Page 141 & 142

New York—Pressure for enameling stock is definitely off in some lines of consumer durable goods, such as refrigerators, washing machines and gas ranges. Few order cancellations are reported to date but there may be some loosening in this regard before yearend. Most manufacturers of durable goods report distributors well stocked and expect their operations to taper further.

Nor have there been many cancellations to date in any major grade of sheets, despite word from Washington there likely will be some fair cutbacks by consumers who specified more fourth quarter tonnage than they were allotted by NPA.

Interesting in this broad regard has been release by the Defense department and the Atomic Energy Commission of approximately 20 million pounds of stainless steel, including 400,000 pounds of nickel bearing steel, for fourth quarter, due to an overestimation of needs for that period. Nickel bearing steel has been in particularly tight supply and word that 400,000 pounds is to be made available for non-military purposes in fourth quarter has resulted in a flurry of inquiry from manufacturers of automobiles and consumer durables generally.

Boston—Silicon sheet demand has dropped below available supply with openings in small motor grades for November and December. January allotments fail to account for all tonnage available. Situation in this grade is the exception in flat-rolled.

Regional CMP approval for small lot orders is so heavy in aggregate many schedules are filled through January with some CMP allotments unplaced.

Philadelphia—Sheet mills are moving cautiously in accepting tonnage for first quarter, and are showing no interest in specifications beyond, except "must" defense tonnage. Most producers expect little in the way of fourth quarter cancellations in the major grades. Despite recent easing in pressure from manufacturers of some consumer durable lines, specifications are picking up again.

Pittsburgh—Cutbacks in existing

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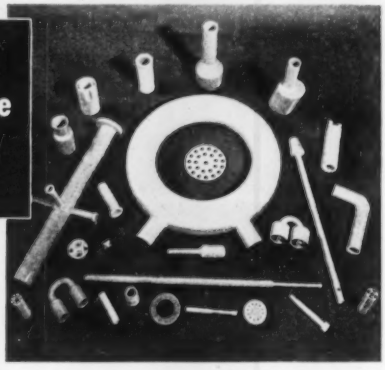

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orders are not developing in the volume expected. Considerable carryover is indicated for each remaining month this year. Trade opinion is mill schedules will not be cleared of carryover by Jan. 1 as NPA requested. Paradoxically, the carryover condition resulted from over-allocation by NPA for third quarter this year. Now NPA wants it eliminated by yearend. No indication of slackening demand is present here as mills book direct defense orders for first quarter 1952 and hold lesser orders in abeyance pending developments.

Cleveland—Galvanized sheets are in tightest supply of the light flat-rolled products. And they will become even scarcer over coming months. Under latest directions of the National Production Authority output will be further limited beginning in October because of the shortages of zinc. Work stoppages caused a loss of 17,000 tons of zinc in September and will result in additional loss of 12,000 tons in October.

Cincinnati — Sheet mills will be pushed to deliver all tonnage on fourth quarter schedules. Rated orders for first quarter are numerous.

Birmingham—Sheet users lacking directives are out of luck since the mills have no excess tonnage. It is reported that choice has had to be made between some customers with certificates in view of the fact the entire outfit is accounted for.

Los Angeles—Sheet and strip shortage is settling heavily upon district fabricators. Despite a tight labor market, worker layoffs due to lack of work caused by inability to procure shipments on time or at all are up to ⅓ of total personnel at some plants. Some fabricators unable to secure defense business, are closing their doors.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 141

Chicago—Many jobs may be stymied by lack of reinforcing bars and related items. Contractors' requests for even small lots are failing to get Washington approval.

Wire . . .

Wire Prices, Page 143

Chicago—Wire rope supply is adequate. Orders are at low level. Some pickup is anticipated with increased coal mining in Illinois and Indiana. Poor corn crops in Iowa has reduced demand for wire mesh cribs. Distributors take all coiled baling wire they can get but are curbing acceptance of bale ties to balance needs. Nail stocks are fair but barbed wire and woven fence are short.

Boston—Wire supply is improving. Carbon wire inventories are heavier, and, while there are some tight spots, pressure is off with scattered cancellations and deferments. Actually some selling effort is required to round out November and December schedules.

New York—Mild slackening in demand for high carbon specialties is attributed to lower consumption in some cases and inventory limitations in others. This prompts deferments rather than outright cancellations. Automotive requirements have been adjusted to lower fourth quarter as-

semblies and some valve spring wire has been held up. Precision spring volume is also off, exceptions being several spring shops with large direct defense contracts, notably fuzes.

Tin Plate . . .

Tin Plate Prices, Page 142

Pittsburgh — Domestic container producers may get an additional 100,000 tons of tin plate in fourth quarter if they can prove need. NPA has made no commitment concerning potential tonnage over entire fourth quarter requirements, but allocations will be forthcoming soon. Tin plate producers will satisfy all CMP allotments for fourth quarter and have tonnage remaining. Tin supplies are adequate but difficulty is encountered maintaining inventories.

Structural Shapes . . .

Structural Shape Prices, Page 141

New York — August structural bookings were 211,998 tons, off 5 per cent from the July total of 223,130 tons, reports the American Institute of Steel Construction. Bookings in first eight months of 2,163,922 tons are up 10 per cent over corresponding period of 1950.

Shipments were 240,072 tons, only slightly less than the June record of 257,066 tons, largest month since 1930. Shipments for first eight months amounted to 1,814,116 tons, gain of 24 per cent over last year.

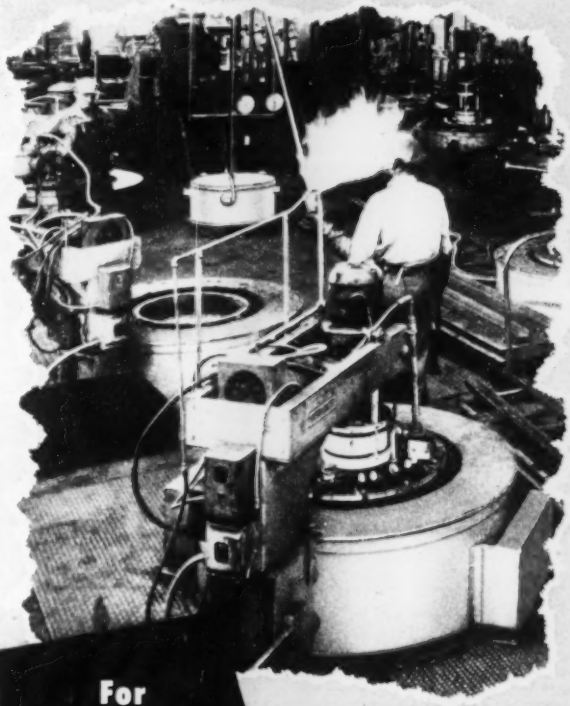
Order backlogs as of Aug. 31 amounted to 1,184,490 tons for the following four months and another 1,563,825 tons for shipment beyond that period, or potential volume ahead of 2,748,315 tons.

Boston—Not until fabricated structural steel required for military and top-rated industrial plant expansion is shipped will the shortage ease for less important construction. This means fourth quarter, 1952. Public works under contract, bridges included, will be set back and next year's programs delayed. Rejected bridge jobs to be readvertised in this area approximate 23,000 tons.

New York — Structural demand shows little improvement. Aside from some bridge work and a few other public projects, inquiry is decidedly slow. There are so many uncertainties as to materials supply and costs once supplies do ease, builders are hesitant to go ahead. Shortage of shapes may ease somewhat after turn of the year. Meanwhile, fabricators doubt if they will be able to obtain enough plain material, plates and bars as well as shapes, to sustain operations in fourth quarter.

Pittsburgh—Little supply relief in structurals is likely before fourth quarter 1952. Industrial expansion and public works construction is expected to decrease by then. Apart from industrial and public work little tonnage is being placed.

Chicago — Structurals shortage threatens much highway construction. Indefinite delay faces this city's $5 million elimination of the Foster Ave. bottleneck on Lake Shore drive scheduled for 1953 completion. Of 3000 tons of steel requested for a bulkhead the government has set aside only 254 tons for second quarter. About 10 days beam production was



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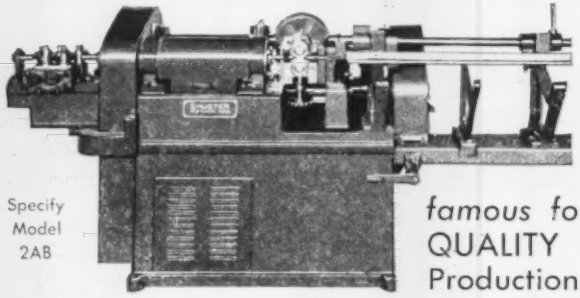

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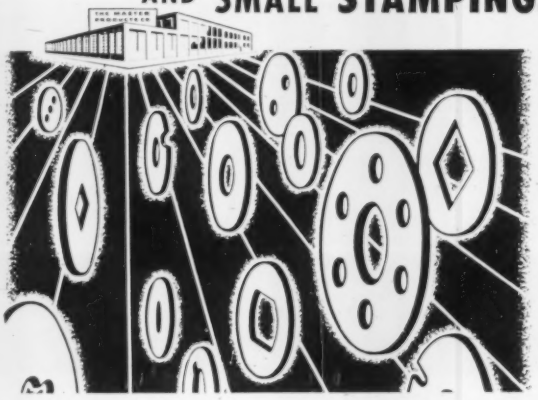

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Semifinished Steel . . .

Semifinished Prices, Page 141

Birmingham—Operations at the Tennessee Coal, Iron & Railroad Co. are back to normal after an 18-day strike of workers on the Birmingham Southern railroad which closed down several mills and two blast furnaces.

Steel Bars . . .

Bar Prices, Page 141

New York—Hot carbon bar producers are adhering to their policy of accepting little tonnage for rolling beyond first quarter except for "must" military requirements. They are receiving requests from buyers with CMP ratings for shipments as late as third quarter, but in practically all cases their orders are being returned on the theory few can definitely foresee their needs that far ahead. Even on requests for first quarter tonnage sellers are moving conservatively until there is more definite word as to what NPA is going to allocate for the period. The government recently sent out first quarter allotment applications which are to be returned by Oct. 1.

Boston—Carbon and alloy bars are building up greater demand for direct defense, notably small arms. One typewriter plant is tooling up for rifles, also one textile mill equipment builder will produce machine guns and parts. Meanwhile Springfield armory is placing substantial orders for barrel blanks, one to Republic Steel Corp., $81,770.

Philadelphia—What relatively few openings have appeared in carbon bar schedules for fourth quarter have been quickly filled in, with much excess inquiry still going begging.

Pittsburgh—Carbon bars are the scarcest steel product in this area. Converters dimly view future prospects for hot bar supplies. Cold-finished bars are in slightly better supply, however. Alloy bars, especially nickel, are virtually unobtainable. Critical-alloy supply conditions are not likely to improve in the near future.

Cleveland—Tight supply conditions in the merchant bar market promise to extend well into 1952. Currently, some producers are booking orders cautiously for first quarter and indicate they will accept tonnage only on military account for later shipment. Predicted cancellations of duplicate orders have not come to the barmakers in any appreciable volume.

Iron Ore . . .

Iron Ore Prices, Page 147

Cleveland—Lake shippers are increasingly confident that this season's ore movement will exceed 91 million tons and may come close to the record of slightly over 92 million tons for 1942. The season's total movement to Sept. 24 is 68,758,853 tons, or 12,628,438 tons greater than the 56,130,415 tons recorded for the like 1950 period. Shipments for the week ended on the same date came to 2,997,873 tons against 2,760,296 tons for the like week a year ago. With

the aid of a bigger and faster ore fleet, shippers hope to at least equal record shipments for the last three months in the year. These are 11,600,000 tons for October, 7,660,000 for November and 835,000 tons for December.

Hamilton, Ont.—Dominion Foundries & Steel Ltd. will begin construction soon of a second ore bridge on its property here. The 300-foot span may be completed in time for opening of the 1952 shipping season.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 145

Chicago—Easiness in metallurgical coke continues. Increased production and declining consumption is responsible.

Pig Iron . . .

Pig Iron Prices, Page 140

Cleveland—Merchant iron sellers expect demand pressure to rise steadily from here on in step with expanding defense requirements for castings. Additional foundries are getting into defense work, but the slack resulting from the contraction in civilian durable goods production still remains to be taken up. Most active foundries at present are those engaged on castings for the machine tool and machinery industries.

There is little chance iron supply conditions will materially improve over coming months. Currently, one stack normally supplying the merchant trade is down for repairs, and this suspension is adding to the burden on other merchant iron suppliers.

Republic Steel Corp. blew-out No. 1 stack for relining Sept. 22. This stack has been producing basic iron. It will be out 4 to 5 weeks.

An important recent development in the trade is announcement by Interlake Iron Corp., with headquarters in this city, to the effect it plans an expansion program aimed at boosting its pig iron capacity by 23 percent. The program calls for modernizing and enlarging blast furnaces at Chicago and Erie, Pa., and relining and improving a second furnace at Chicago. These improvements will raise Interlake's pig iron capacity to 1,620,000 net tons annually from the present 1,320,000 net tons.

Boston—Machine tool is the one industry from which pig iron demand is expanding. Most others are standing still or losing ground, exceptions being the few foundries with direct armament contracts. Machine tool builders are booking heavy orders or negotiating for them. Bullard Co. has a $33-million order while other Bridgeport shops have taken $1.3-million additional.

New York—Few pig iron consumers have the full 30 day inventories permitted under government regulations. Accordingly they are trying to build up their stocks. Some have less than two weeks supply on hand. Gray iron foundries report heavier order backlogs and anticipate a more active season as fall progresses. One boon to operations for some time past has been a fairly free supply of cast scrap.

Buffalo—Building equipment and motor casters are vieing with government contractors for merchant

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iron stocks. Increased defense work combined with the shutdown of a stack here have added to the supply stringency. Additional shipments of Swedish iron ore are reported.

Philadelphia—While some imported tonnage is being received against old contracts, few new orders for foreign pig iron are noted. This is due to stiff premiums, uncertainty as to deliveries, and in some cases quality. Demand for domestic iron continues in excess of supply.

Pittsburgh—Pig iron supplies are generally adequate throughout the area. Inventories are not large but major worry of melt shops is not pig iron so much as scrap. Merchant suppliers maintain equitable distribution. In specialty grades and alloys, the supply situation is slightly more stringent and purchasers must wait their turn, all having virtually no inventory. Presently all 54 of the district's blast furnaces are in operation. One stack at United States Steel Co.'s Duquesne Works may be taken off for repairs shortly.

Chicago—Demand for pig iron is not quite as strong as 30 days ago. Easing is result of component parts inventory reductions on part of some large manufacturers notably farm equipment, strikes, reduced operation of automobile makers and lessened activity of jobbing foundries. Of the districts 42 blast furnaces 41 are now operating.

Los Angeles—Records were broken in August at the Fontana plant of Kaiser Steel Corp. New production records set at Fontana in August include those for low coke consumption, pig iron and semifinished steel output. No. 1 blast furnace averaged 1327 pounds of coke per ton of iron and No. 2 blast furnace 1358 pounds; 30 per cent below the national average of 1900 pounds of coke per ton of iron. Pouring by Fontana's two blast furnaces of 83,200 tons of hot-metal in 31 days exceeded combined rated capacity of 74,400 tons by 11 per cent.

Scrap . . .

Scrap Prices, Page 148

Pittsburgh—Upping of scrap ceiling prices is suggested in some market circles as a likely spur to bringing out material. Dealers here think there is very little scrap held out for higher prices, however and that an increase would not be particularly effective in increasing scrap flow.

Philadelphia—Critical situation is developing among district consumers of steel scrap, due to material moving west, much at upgraded levels. Some district mills have less than a week's supply and while they are being given allocations they are finding, it is said, that much open hearth tonnage has and is being shipped inland against premium foundry steel orders.

Boston—Scrap drive is estimated to have brought out approximately 22,000 tons which might otherwise be dormant. This has helped in the steel scrap shortage but little with inventories of most melters low. Not enough light scrap is reaching yards to keep presses near capacity.

New York—Demand pressure for steel scrap is heavy with consumers scarcely able to sustain inventories, to say nothing of building them up for winter. Trade leaders believe much could be accomplished towards stimulating the flow by action of the Office of Price Stabilization in establishing the major open hearth grades at one price level—a level at least not below the present market for No. 1 heavy melting steel.

Buffalo—Local scrap market assumed a more normal pattern with the mills again receiving material from local dealers who had been allocating supplies to other points. Mills are hopeful of replenishing stockpiles for future months. Collections are holding up favorably in the territory. Revival in water shipments is slow in developing. Cast offerings continue ample.

Detroit—Not enough attention is being paid to segregation of nickel and chrome bearing scrap. Dealers say larger companies watch this but small ones generally overlook it. Control of scrap through allocation has widened and the only grades not scarce are for blast furnace use.

Cincinnati—District mills are making no headway building scrap stocks. Supplies are barely adequate to maintain the high melting rate.

Chicago—The spotlight is on the various scrap collection drives. Optimism is expressed over ultimate success of these. However, this optimism does not conceal the anxiety of steel plants and foundries concerning possibility of cutbacks this winter because of insufficient melting material.

Birmingham—Heavy melting steel continues tight with the district's largest user being taken care of through allocation. Cast grades have tightened considerably.

Los Angeles—Supply of scrap is tight. Mill inventories are steadily deteriorating.

Warehouse . . .

Warehouse Prices, Page 147

Cleveland—Warehouse operators in this area are encouraged by NPA action in raising their steel quotas to 100 per cent of base period receipts on carbon and alloy steels. The increase does not become effective until first quarter next year, however, and means nothing so far as current supplies are concerned. As a matter of fact, it is doubtful if the increase in quotas will be sufficient to offset the loss of tonnage heretofore available to the distributors in the so-called "free" area of supply, eliminated with the closing up of the open-end of the Controlled Materials Plan.

New York—Warehouse sales volume is limited to receipts from mills with inventories 40 per cent or less of normal. Increase in allocations to distributors, first quarter, to 100 per cent minimum of base period tonnage, includes all products, alloys and stainless as well as carbon. Bulk of stainless allotments will be in chromium grades.

Philadelphia—While not in receipt of official text, said to be in hands of government printers, warehouses are advised quotas will be stepped up to 100 per cent of the base period of the first nine months of last year, effective Jan. 1, against 85 per cent at present.

Pittsburgh—Distributors' inventory

problems are the same from month to month. When stocks can be built up slightly they are very unbalanced, but they are seldom built up to the point they can be called an inventory. Receipts show no signs of falling below the NPA 85 per cent minimum base period level but volume of business in warehouse items has increased greatly over base period levels.

Los Angeles—Inquiries for warehouse steel are depressed but with distributors' badly unbalanced stocks, 30 to 40 per cent of normal, gap between demand and supply is widening.

Rails, Cars . . .

Track Material Prices, Page 143

New York—Featuring the railroad equipment market is purchase of 261 diesel-electric units, costing approximately $35 million, by the New York Central railroad, with 24 for its affiliated line, Pittsburgh & Lake Erie. Order also has been placed for 1000 seventy-ton gondolas by the Norfolk & Western.

Philadelphia — Rail inquiries for 1952 are coming out with the Pennsylvania closing bids Oct. 3 for 100,000 tons. Bids on accessories for 1952 will be asked shortly.

Montreal, Que.—Canadian Pacific Railway Co. placed orders with Canadian companies for more than $50 million worth of equipment to be delivered in 1952. The orders were for 50 diesel-electric locomotives, 4250 freight cars and 50 units of head-end passenger equipment.

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STRUCTURAL SHAPES . . .

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2750 tons, municipal viaduct, Russell street, Baltimore, to Bethlehem Steel Co.

2640 tons, piling, three bridges for Delaware River Toll Bridge Commission, to Bethlehem Steel Co.

1700 tons, power plant, Narragansett Electric Co., Providence, R. I., to Lehigh Structural Steel Co., Allentown, Pa., through New England Power Co., parent organization.

630 tons, building, St. Vincent's Hospital, Worcester, Mass., to United Structural Steel Co., Worcester, through Granger Construction Co., Worcester, general contractor.

600 tons, outside crane runway, Corps of Engineers, Tullahoma, Tenn., to Decatur Iron & Steel Co., Decatur, Ala.

575 tons, buildings, Our Lady of Fatima Hospital, Providence, R. I., to A. O. Wilson Structural Co., Cambridge, Mass.; Gilbane Building Co., Providence, general contractor; 165 tons bar joists to Bethlehem Steel Co.

380 tons, plant addition, Norden Co., Milford, Conn., to Bethlehem Steel Co.

330 tons, state bridge, Lackawanna county, Pennsylvania, to Pine Brook Iron Works, Scranton, Pa.

275 tons, mill building, Pennsylvania Smelting & Refining Co., Philadelphia, to Bethlehem Steel Co.

250 tons, hospital, Norwalk, Conn., to Harris Structural Steel Co., New York, through William J. Lyons, Norwalk, general contractor.

250 tons, building, Army Ordnance, Boston district, to A. L. Smith Iron Works, Chelsea, Mass.

190 tons, state bridge, Chester county, Pennsylvania, to Easton Steel Structures, Easton, Pa.

STRUCTURAL STEEL PENDING

178 tons, state bridge, Indiana county, Pennsylvania; bids Oct. 11.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1750 tons, housing project PHA 2-20, Columbia Point, Dorchester district, Boston, to Truscon Steel Co., Boston, through Coleman Bros. Corp., that city, general contractor.

1700 tons, three bridges, Delaware River Toll Bridge Commission, to Bethlehem Steel Co.

1600 tons, building, St. Vincent's Hospital, Worcester, Mass., to Tucker & Fox Co., Boston, through Granger Construction Co., Worcester, general contractor.

645 tons, Harms road intereceptor sewer, contract No. 1, Northfield, Ill., to Joseph T. Ryerson & Son Inc., Chicago; Michael Pontarelli Inc., Chicago, contractor.

600 tons, Blue Ridge Summit, Hagerstown, Md., for U. S. Engineer, to United States Steel Supply Co., Chicago.

150 tons, Gordon Park improvements, Cleveland, to United States Steel Supply Co., Chicago.

105 tons, William Dwight Herrick Jr. High School, Downers Grove, Ill., to Concrete Steel Co., Chicago; Schless Construction Co., Inc., Chicago, contractor.

100 tons, buildings, Our Lady of Fatima Hospital, Providence, R. I., to Bethlehem Steel Co.; Gilbane Building Co., Providence, general contractor.

100 tons, elementary school building, Cranston, R. I., to Plantations Steel Co., Providence, R. I.; Dimeo Construction Co., Providence, general contractor.

60 tons, hospital, Norwalk, Conn., to Harris Structural Steel Co., New York, through William J. Lyons, Norwalk, general contractor.

REINFORCING BARS PENDING

6800 tons, miscellaneous buildings, Army Finance Center, Ft. Benjamin Harrison, Indianapolis; general contract divided between Sherry-Richards Co., Chicago, James McHugh Construction Co., Chicago, Corbetta Construction Co., Inc., Chicago, and Willcox Corp., Long Island City, N. Y.

310 tons, Corps of Engineers, St. Louis; bids Oct. 1.

900 tons, Mayo Clinic Hospital, Rochester, Minn.

854 tons, reinforced concrete hangar, Trans

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DI-ACRO DIE-LESS DUPLICATING
Contains full information plus Engineering Service offer.
O'NEIL-IRWIN MFG. CO.
304 8TH AVE., LAKE CITY, MINN.
Please send 40-page catalog including "Die-Less Duplicating" Engineering Service Offer.
Name
Company
Address
City State

World Airlines Inc., Municipal Airport, Chicago; bids in.

775 tons, apartment building 60th & Cottage Grove avenue, Chicago; S. N. Nielsen Co., Chicago, low on general contract.

600 tons, pumping station, Detroit.

575 tons, Bayou Boef lock, St. Mary Parish, New Orleans; bids Oct. 16, Corps of Engineers, that city.

393 tons, hospital and nurses home, Hinsdale, Ill.; bids in.

356 tons, state bridge work, Indiana county, Pennsylvania; bids Oct. 11.

304 tons, Dentistry, Medical and Pharmacy building, University of Illinois, Chicago; Joseph J. Duffy Co., Chicago, low on general contract.

192 tons, Library and Law School, University of Toledo, Toledo, O.

140 tons, state bridge work, Beaver and Lawrence counties, Pennsylvania; bids Oct. 11.

160 tons, dormitory, University of Illinois, Urbana, Ill.; John Felmley & Sons Co., Bloomington, Ill., low on general contract.

157 tons, high school, St. Charles, Ill.; Poirot Construction Co., Chicago, low on general contract.

152 tons, dormitories, University of Toledo, Toledo, O.

150 tons, bars and structurals, square span plate girder bridge and approaches, East Hartford, Conn.; bids Oct. 1, Hartford, Conn.

Unstated, junior high school, Elkhart, Ind.; bids Oct. 23.

Unstated, industrial building, McGill Mfg. Co., Valparaiso, Ind.; bids Oct. 2.

Unstated, hospital, Goshen, Ind.; bids Oct. 25.

PLATES . . .

PLATES PLACED

1390 tons, medium tensile, black, Navy Purchasing Office, Washington, to Kaiser Steel Corp., Oakland, Calif.

200 tons, formed plates, kiln sections, Aluminum Co. of America, Pittsburgh, to Bethlehem Steel Co.

PLATES PENDING

1000 tons, 85 tanks, tank farm, Hammond, Ind., for Public Buildings Service, Washington; Hughes-Foulkrod Co., Philadelphia, low on general contract.

500 tons, tanks, Atlantic Refining Co., Point Breeze, Pa.; bids asked.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Canadian Pacific, diesel-electric locomotives, including six "A" 1600-hp and six "B" 1600-hp units, to newly-established diesel plant of Canadian Locomotive Co., Kingston, Ont.; twenty 1500-hp units, six "A" and 14 "B" 1600-hp units and three road switchers, to General Motors Diesel Ltd., London, Ont.; six 1000-hp standard switchers and twelve 660-hp yard switchers, to Montreal Locomotive Works, Montreal, Que.

Missouri-Kansas-Texas, twenty 1200-hp diesel switchers, divided equally between Electro-Motive Division, General Motors Corp., La Grange, Ill., and Baldwin-Lima-Hamilton Corp., Eddystone, Pa.

Montour, four 1200-hp diesel-electric locomotive units, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

New York Central, 261 diesel-electric units, placed as follows: thirty-two 1500-hp road freight "A" units, thirty-two 1500-hp road freight "B" units, forty 1200-hp yard switchers and twenty 800-hp yard switchers, to Electro-Motive Division, General Motors Corp., La Grange, Ill.; thirty-five 1600-hp road switchers and forty-three 1000-hp yard switchers, to American Locomotive Co., New York; seventeen 1200-hp yard switchers, to Fairbanks, Morse & Co., Chicago; eighteen 1200-hp yard switchers to Baldwin-Lima-Hamilton Corp., Eddystone, Pa.; also included for the New York Central subsidiary, Pittsburgh & Lake Erie, are: twelve 1500-hp road switchers and ten 1200-hp yard switchers, to Electro-Motive Division, General Motors Corp.; and two 2250-hp road passenger "A" units, to American Locomotive Co.; total cost is estimated at $35 million, with this latest purchase increasing the diesel-electric ownership of the New York Central and affiliates to 1915 units, with a total of 2,446,100 hp; deliveries are expected to begin in second quarter of next year and be completed early in 1953.

St. Louis Southwestern, four 1600-hp, diesel-electric road-switching engines, to American Locomotive-General Electric Companies, Schenectady, N. Y.

Union, eleven 1200-hp, diesel-electric switchers, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

LOCOMOTIVES PENDING

Minneapolis, St. Paul & Sault Ste. Marie, 20 diesel electric units; purchase authorized.

RAILROAD CARS PLACED

Bessemer & Lake Erie, U. S. Steel subsidiary, 500 seventy-ton ore cars, to Greenville Steel Car Co., Greenville, Pa.

Canadian Pacific, 1250 freight cars and 50 express cars including: 1000 fifty-ton box cars, 300 fifty-ton automobile cars and 100 seventy-ton flat cars, 25 seventy-ton baggage and express cars, to Canadian Car & Foundry Ltd., Montreal, Que.; 1200 fifty-ton box cars, to own Angus shops in Montreal; 300 seventy-ton longitudinal hoppers cars and 300 seventy-ton drop-end gondolas, to Eastern Car Co., Sydney, N. S.; 400 fifty-ton freight refrigerator cars, 350 fifty-ton box cars, 300 seventy-ton covered hopper cars, and 25 fifty-ton express refrigerator cars to National Steel Car Corp., Hamilton, Ont.

Norfolk & Western, 1000 seventy-ton gondolas, to Virginia Bridge Co., Roanoke, Va.

RAILROAD CARS PENDING

Minneapolis, St. Paul & Sault Ste. Marie, 600 freight cars; contemplated for erection in own shops.

RAILS PENDING

Pennsylvania, 100,000 tons for 1952 requirements; bids Oct. 3; inquiries for accessories will be out later.

Quantity
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of
GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866
THE WHELAND COMPANY
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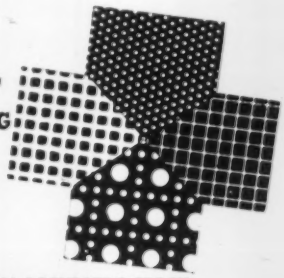
PERFORATING
PLUS



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THESE PERFORATING PLUS EXTRAS

PLUS Experienced "Know How"
PLUS Engineering Consultation
PLUS Special Dies for Your Needs

Whether you need pinpoint perforation for a coffee filter or an ornamental grille for an ocean liner, Accurate Perforating offers all these extras PLUS—a price that's hard to beat. Write today for your free catalog on Accurate Perforated materials.

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ACCURATE
PERFORATING COMPANY
1101 South Kedzie Avenue, Chicago 12, Illinois

Metalworking Briefs . . .

CONSTRUCTION—ENTERPRISE—ORGANIZATIONAL CHANGES

Enameled Sink Output Rising

Pittsburgh plant of American Radiator & Standard Sanitary Corp., that city, is being converted to the manufacture of enameled sinks. The plant had produced cast iron plumbing fixtures since 1880 and is the oldest of the company's 29 plants throughout the nation. Production of cast-iron sinks will be increased at other plants to offset conversion at the Pittsburgh plant. The renovated plant will have capacity for producing a wide variety of enameled steel products on jobbing contracts in addition to American Standard sinks.

$1 Million War Contract Let

Interstate Engineering Corp., El Segundo, Calif., signed a contract with Douglas Aircraft Co. Inc., Santa Monica, Calif., for production of fuselage subassemblies for use on the Douglas AD-4 attack bomber. Total amount of the contract is in excess of $1 million.

Plans Tungsten Smelter

Black Rock Mining Corp.'s Lincoln Mines Division is planning construction of a tungsten-concentration mill near Hiko, Nev., at a cost of $600,000. Presently, tungsten ore shipments are shipped to Bishop, Calif., for processing. Company officials said the mill would have a capacity of 250 tons of ore a day.

Lovequist Doubles Capacity

Lovequist Engineering Co., Los Angeles, doubled production capacity for machining of precision aircraft parts by moving into a building at 8737 Melrose Ave., that city. The firm is increasing its facilities to meet heavy production schedules under contracts with major aircraft manufacturers.

Allied Machine Incorporates

Allied Machine Fabricators Inc. was incorporated in Buffalo. Incorporators are Viola Pearl, Buffalo; Roland H. Tills, Hamburg, N. Y.; and Paul C. Stillman, Williamsville, N. Y.

Machine Tool Output Gains

Cincinnati Milling Machine Co., Cincinnati, completed construction of a plant near Wilmington, O., having 110,000 square feet of factory floor space and 20,000 square feet of office space. Output will supplement Cincinnati manufacture of grinders, lathes, drills and other products. R. S. Collier is resident manager.

Installs Stamping Machine

BMC Mfg. Corp., Binghamton, N. Y., producer of toy automobiles, installed an 80,000 pound stamping machine which had been on order for more than a year. The machine is similar to two others the plant has for stamping out metal bodies for the toys.

Foundries Seek Workers

Three malleable iron foundries in the Buffalo area are busier now than at any time since World War II and are searching for additional workers to meet the heavy demand for their products. They are Acme Steel & Malleable Iron Works, Lancaster Malleable & Steel Corp. and Kencroft Malleable Co. Inc.

Convair Gets War Work

Consolidated Vultee Aircraft Corp., San Diego, Calif., was awarded a contract by the Air Force for "further development" of a new, very high performance interceptor airplane. On Sept. 5, Convair was named the winner of a contract for the development of America's first atomic-powered plane.

Valve Maker To Build Plant

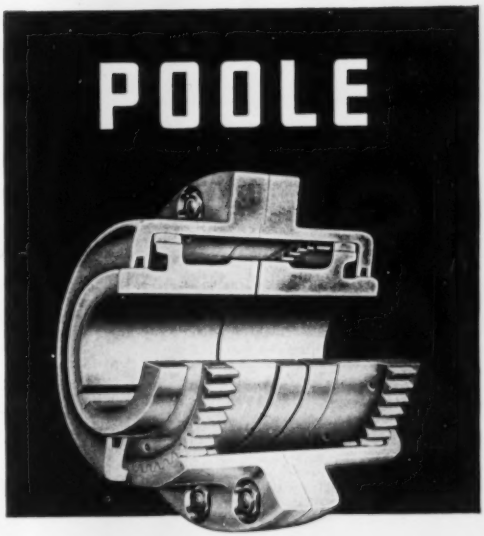
General Metals Corp., Adel Division, Burbank, Calif., was granted a certificate of necessity by Defense Production Administration for $209,122. Automatic control equipment is being installed for the production of hydraulic valves.

Ford Stampings Output Gains

New stampings plant of Ford Motor Co. in Buffalo is increasing operations steadily. Production, now at about 40 per cent of capacity, will be stepped up materially within the next two months. The plant has run into a shortage of tool and die makers.

Veneman Forms Vesco Inc.

C. Clarke Veneman, formerly associated with Caster and Wheel Division, Divine Bros. Co., Utica, N. Y., incorporated a materials handling agency in Charlotte, N. C., to be known as Vesco Inc. The new firm, located at 2826 Camden Rd., will represent Divine Bros. Co. (truck caster and wheel products); Arrow Products Inc. (conveyors), Grand Rapids, Mich.; Ironbound



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FLEXIBLE COUPLINGS

POODLE FOUNDRY & MACHINE COMPANY WOODBERRY, BALTIMORE, MD.

THE BELMONT IRON WORKS

STRUCTURAL STEEL—BUILDINGS & BRIDGES

RIVETED—ARC WELDED Cable Address—Beliron

Engineers—Fabricators—Erectors—Contractors—Exporters

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SCREW MACHINE PRODUCTS made to your order!

SET SCREWS CAP SCREWS SPECIAL PARTS

STEEL • BRASS • STAINLESS • ALUMINUM

send us your specifications for quotation

SAMUEL J. SHIMER & SONS, Inc. Milton 2, Pa.

KARDONG FOUR-WAY BENDER

For Concrete Reinforcing Bars

Model D-2

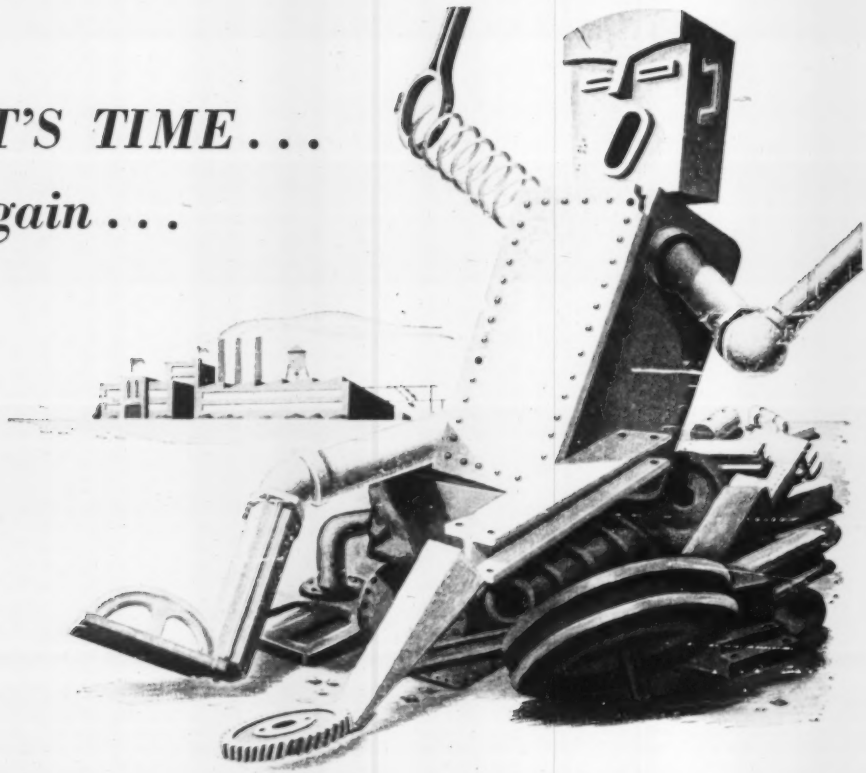
The Model D-2 Kardong Bender is a Four Direction Horizontal Bender. With this bender it is not necessary to turn bars over to make reverse or second bends on beam bars. The Model D-2 is made in two sizes, Model D-2 Standard 6-inch, which will bend bars around collars 2-inch to 6-inch, and Model D-2 Special 8-inch, which will bend bars around collars 2-inch to 8-inch. Capacity of both models, 1"; inch Square Bars. The Model D-2 is a production bender for reinforcing steel fabricating shop. Ask for catalog of our complete line of reinforcing bar benders.

KARDONG BROTHERS, INC.

MINNEAPOLIS 13, MINN.

IT'S TIME . . .

again . . .



TO WAKE UP SCRAPPY!

Scrap's getting scarce again . . . compared to the amounts we need . . . and it's up to *all* of us to *help* produce enough steel.

107,000,000 tons of steel is the present rate of production in 1951 . . . 119,500,000 tons is expected in 1952.

Last year, 1950, we produced 97,800,000 tons.

All that extra steel—enough to take care of *both* military and civilian needs—calls for *more scrap iron and steel.*

Scrap Inventories Are Alarmingly Low

While steel mills are producing at a greater rate than ever, scrap inventories have dwindled. Many mills are operating on a hand-to-mouth basis with shut-downs threatened unless we furnish more scrap.

We *do* have the scrap. It's everywhere, not just in the form of *production* scrap—the "leavings" of machining, normally turned over to scrap dealers . . . but also in the form of *idle* metal: obsolete machines and tools, no-longer-usable jigs and fixtures, gears, chains, pulleys, valves, pipe, abandoned steel structures, etc.

We must have this *idle* metal to keep the furnaces running.

Please cooperate. Set up a Scrap Salvage Program in your plant—*now.* For a complete plan on "how to do it", write for booklet "Top Management: Your Program for Emergency Scrap Recovery". Address Advertising Council, 25 W. 45 Street, New York 19, N. Y.

Why Do We Need *Scrap?*

Steel is made half from pig iron, half from scrap. With production on the increase, more scrap must be purchased. And it's up to you to "dig it out" and sell it.

NON-FERROUS SCRAP IS NEEDED, TOO!

This advertisement is a contribution, in the national interest, by

STEEL

The Weekly Magazine of Metalworking

A PUBLIC SERVICE PROJECT THE ADVERTISING COUNCIL

Box & Lumber Co. (trucks and skids), Hillside, N. J.; Stratton Equipment Co. (portable cranes), Cleveland; Lift-Trucks Inc. (trucks, skids, etc.), Cincinnati; Gerrard Steel Strapping Co. (steel strapping), Chicago.

Observes 50th Anniversary

Alvey-Ferguson Co., Oakley, Cincinnati, recently observed its fiftieth anniversary. The firm manufactures conveying systems.

Tape Maker Enlarges

Carlson & Sullivan Inc., Los Angeles, is constructing a 14,000 sq ft building in Monrovia, Calif. The company makes steel tape rules.

Buffalo Plant Boosts Output

American Car & Foundry Co., New York, is stepping up production rapidly at its Buffalo plant. Several idle buildings on the property are being reopened, new machinery is being installed and employment is scheduled to be doubled to about 500 by the yearend.

Robinson Fan Changes Name

Robinson Fan Corp., Gilroy, Calif., manufacturer of agricultural equipment and fans, has changed its name to Air-O-Fan Products Corp.

Aro Buys Pyles Industries

Aro Equipment Corp., Bryan, O., purchased Pyles Industries Inc., Detroit, and will operate the company as a subsidiary. The Pyles firm makes heavy duty pumps, metering devices, flow guns and special equipment for handling industrial lubricants. George S. Pyles will continue as president of the subsidiary.

Microwave Tube Firm Grows

Varian Associates, San Carlos, Calif., will expand research and production of microwave tubes. This electronics firm was granted a $1,520,000 emergency loan by Defense Production Administration.

DPA Grants Loan to Rezolin

Rezolin Inc., Los Angeles, received a loan from the Defense Production Administration for construction of a plant at W. 96th St., Los Angeles International Airport Industrial Tract, for manufacture of plastic tooling and plastic materials for the aircraft industry.

Metal Hose Firm Expands

Chicago Metal Hose Corp., Maywood, Ill., is building a plant for the fabrication of aircraft assemblies and components in Memphis, Tenn. The company, which will observe its 50th anniversary next year, makes flexible metal hose, pipe-

GOING UP: Workmen at Republic Steel Corp.'s 15-furnace open-hearth building in Cleveland are assembling gears on an overhead crane trolley. When completed, the trolley will be raised to the crane bridge above. The work is part of Republic's improvement program to increase steel production in Cleveland

line expansion joints, bellows and thermostats, and precision aircraft assemblies. Production equipment is scheduled to move into the Memphis plant in January with full operation contemplated by Mar. 1 when 60,000 square feet will have been completed.

Duro-Test Forms Subsidiary

Duro-Test Corp., North Bergen, N. J., manufacturer of fluorescent and incandescent lights and fixtures, organized a subsidiary, Duro-Test of California, to take over its West Coast activities.

New Mill For Detroit Steel

Eichleay Corp., Pittsburgh, was awarded the contract for foundations, mechanical installation and necessary building alterations for the 3-stand tandem cold mill, temper mill, continuous strip pickling line, annealing furnace and miscellaneous auxiliaries at the Portsmouth plant of Detroit Steel Corp.'s plant at Portsmouth, O.

Buys Pipe Fittings Business

Pacific Fittings Division, General Metals Corp., expanded its line of malleable iron pipe fittings through acquisition of the fittings business of Pittsburgh Valve & Fittings Corp., Barberton, O. In a previous report on this development, STEEL inadvertently omitted the word "fittings." Equipment and inventory of

Investigate the Advantages of H & K PERFORATIONS

—for cleaning, grading, straining and filtering . . . guarding and ventilating . . . accoustical treatment . . . ornamental enclosure, and related problems of product and machine design.

You have a wide selection of patterns to choose from, all accurately perforated.

For commercial processing, perforations may be had with as close as ±.0005". Materials include practically all metals and sheet materials such as plastics, fabrikoids, plywood, etc.

Ornamental grilles—modern and classical patterns—are perforated in any currently available metal—finely finished.

Perforated sheets may be furnished rolled, formed, sheared, welded, brazed or otherwise fabricated to your specifications.

Catalog No. 62 tells the "hole" story—write for it!

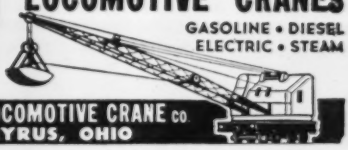
The Harrington & King Perforating Co

5634 Fillmore Street, Chicago 44, Illinois
114 Liberty Street, New York 6, New York

Famous FOR ACCURACY OF THREADS
LOW COST OF CHASERS
LESS DOWNTIME, 100% DEPENDABILITY
Free Bulletins

THE EASTERN MACHINE SCREW CORPORATION
22-42 BARCLAY ST., NEW HAVEN, CONN.
Pacific Coast: A. L. Behringer, 154 N. San Pedro St., Los Angeles. Canada: F. F. Burlet Machinery Co., Toronto.

OHIO LOCOMOTIVE CRANES



GASOLINE • DIESEL
ELECTRIC • STEAM
25 TO 40 TON CAPACITY

THE OHIO LOCOMOTIVE CRANE CO.
BUCYRUS, OHIO

T. H. LEWTHWAITE MACHINE CO.
Hand Operated

CUTTERS
PUNCHES
BENDERS

For 63 years we have been designing and manufacturing tools for and selling tools to the metal-working trades.

This sturdy bender will bend up to ½" square or round iron, 2" x ½" channel iron, 2¼" x ⅜" flat iron cold.

SEND FOR CATALOG SHEETS ON OUR COMPLETE LINE

310 EAST 47TH STREET NEW YORK 17, N. Y.

"One of the surest ways to make money is to save money..."

CAPTAIN EDDIE RICKENBACKER

President and General Manager
Eastern Air Lines, Inc.

"... and the purchase of U. S. Savings Bonds through the Payroll Savings Plan is an easy way to save. It is good for the community. It is good for you because it means money available for a rainy day. Through the thousands of years that men have roamed the globe there have always been rainy days."

A vigorous exponent of thrift, Captain Eddie Rickenbacker made the Payroll Savings Plan available to his employees of Eastern Air Lines some years ago. From time to time, in personally dictated letters addressed "To All Members of Eastern Air Lines Family", he points out the individual and national advantages of the Payroll Savings Plan, and urges members of Eastern Air Lines Family "... to sign up on the Automatic Payroll Savings Plan. In years to come I am sure you will be mighty glad you did."

How about *your* Payroll Savings Plan? What have you done since Savings Bonds became Defense Bonds? What is your percentage of employee participation?

From coast to coast, companies large and small are installing the Payroll Savings Plan or revitalizing their present plans through person-to-person canvasses which put a Payroll Savings Application Blank in the hands of every employee.

Note the results of some recent person-to-person canvasses. Think what management efforts like this mean to the Defense effort. Then phone, wire or write to Savings Bond Division, U. S. Treasury Department, Suite 700 Washington Building, Washington, D. C. Your State Director will be glad to help you put in a Payroll Plan or show you how to conduct a person-to-person canvass.

Results of recent person-to-person canvasses to increase participation in Payroll Savings

39 companies . . . total employees	487,347*
Employees on plan before canvass	81,481
Employees on plan after canvass	329,942
% of participation before canvass	16.8%
% of participation after canvass	67.7%
New savers added to plan	**248,461**

Based on National averages, employees in this group of companies are saving more than $7,000,000 every month in United States Defense Bonds.

*Includes 82,870 employees of six companies which did not have plan before canvass.

The U. S. Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

STEEL

The Weekly Magazine of Metalworking

Pittsburgh Valve & Fittings Corp. is being transferred to Pacific Fittings' plants in Los Angeles and San Francisco. This transaction, involving an expenditure by General Metals Corp. of about $500,000, will result in the largest integrated manufacture of a complete line of malleable fittings on the Pacific Coast.

Western Brass Builds Plant

Western Brass Works, San Pedro, Calif., is constructing a plant at 1301 Sepulveda St. for production of brass castings, bronze bushings and bearings. Completion is scheduled by April.

Collins Radio Co. Enlarges

Collins Radio Co., Cedar Rapids, Iowa, will construct a $250,000 building addition to its Western Division, Burbank, Calif., plant.

New Plant For Reserve

Reserve Supply Co., Chicago, is building a manufacturing plant near Franklin Park, Ill., at an estimated cost of $500,000.

Allis-Chalmers Names Agent

Columbia Electric Supply Co. Inc., Washington, was named a distributor for motors produced by Allis-Chalmers Mfg. Co., Milwaukee.

Moves San Francisco Office

Whitney Chain Co., Hartford, Conn., moved its San Francisco district office to larger quarters at 70 Dorman Ave. The office is under the direction of George F. Haag, district manager.

Librascope Builds Addition

Librascope Inc., Glendale, Calif., is adding facilities costing $250,000 to its electronic development and production plant.

Pastushin Changes Name

Pastushin Aviation Corp. is the new name of Vic Pastushin Industries Inc., Los Angeles. This aircraft-components manufacturing firm is in full production of external fuel tanks for Air Force jet fighters at its Los Angeles plant and has under way other important defense projects. Ownership and management of the firm remain the same.

Sales Executives Move

Frank B. Molen, midwest technical sales representative for molding powders and resins manufactured by Naugatuck Chemical Division, United States Rubber Co., moved his headquarters from the division's plant in Naugatuck, Conn., to the division's branch office at 247 E. Exchange St., Akron, O. Richard H. Malamphy, who holds a similar position along the eastern seaboard, established headquarters in the division's branch office at 254 Fourth Ave., New York.

Hamilton Buys Case Maker

Hamilton Watch Co., Lancaster, Pa., purchased all outstanding stock of Ralph W. Biggs & Co., Stamford, Conn. The latter firm, a producer of watch cases, will be continued as a wholly-owned subsidiary.

Terminal To Be Demolished

New York Central Railroad, preparing for complete dieselization of its St. Lawrence Division, is constructing facilities for servicing diesel locomotives at Watertown, N. Y. When they are completed, Central plans to abandon a large part of its Pine street yard at Watertown and to demolish its steam engine terminal and coal dock.

Sivley Iron Works Moves

Sivley Iron Works Inc. moved its offices to 1921 First Ave. S., Birmingham 3.

TOPPER: Nails pour freely into the tops of new fiber boxes being used for packaging them at Columbia Steel Co.'s Pittsburg, Calif., plant. The box top serves as a nail carrier for the carpenter. Fibre boxes have other advantages over the familiar wooden kegs: 30 per cent saving in storage space; easier and safer handling; savings in shipping costs; and the replaceable tops protect nails against dust and corrosion

FORGINGS
HAMMERED STEEL FORGINGS
up to 6000 lbs. each
ALL TYPES
Smooth Forged Finished
Rough Turned Hollow Bored
and Heat Treated to Specifications
CRANKSHAFTS. CONNECTING RODS. SHAFTING
Roll—Gear Blanks—Pinions and Miscellaneous Forgings
BAY CITY FORGE CO.
ERIE, PA.
Over a Quarter of a Century of Dependable Service and Quality Products

The Cleveland Steel Tool Co.
• PUNCHES • DIES • CHISELS • RIVET SETS •
IF IT'S RIVETED YOU KNOW IT'S SAFE
WE FEATURE SPECIAL PUNCHES & DIES
660 E. 82nd ST., CLEVELAND, O.

PRODUCERS OF Hot Rolled ELECTRIC FURNACE QUALITY
BARS • SMALL SHAPES • STRIP
BOIARDI STEEL CORPORATION
300 Lower Market St. Milton, Penna.

IT'S EASY as ABC
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To reach the metalworking market. Just list the materials or machines you have for sale in the "Equipment—Materials" section and STEEL will do the rest. It is read weekly by specifiers and buyers in the plants which do more than 92% of the metalworking industry's business. For rates and further details, write STEEL, Penton Building, Cleveland 13, Ohio.

MATERIALS--USED EQUIPMENT

RAILROAD EQUIPMENT—*FOR SALE*

STANDARD GAUGE FREIGHT CARS

Box, Single Sheathed, 50-Ton
Cabooses, Eight Wheel, Cupola Type
Flats, 50-Ton, Steel Underframe, 40'0"
Gondolas, Composite or All Steel, 50-Ton and 70-Ton
Hoppers, Covered, All-Steel, 50-Ton & 70-Ton
Hoppers, Twin, All-Steel, 50-Ton, Cross Dump
Hoppers, All-Steel, 70-Ton, Cross Dump
Tank, 8,000-Gallon, Class II

EXTRA LONG FLAT CARS

40 & 50-Ton Capacity, Length 70' and 74'

STANDARD GAUGE DUMP CARS

Side Dump, 16-Yd., 30-Ton, Lift Door
Side Dump, 20-Yd., 40-Ton, Lift Door
End Dump, 20-Yd., 50-Ton, Drop Door
End Dump, 10-Yd., 30-Ton, Lift Door

STANDARD GAUGE LOCOMOTIVES

Two Plymouth Diesel-Electric, 45-Ton, Standard Gauge, Type 0-4-4-0, Built 1942

Gasoline—10-Ton to 25-Ton
Diesel-Mechanical—8-Ton to 30-Ton
Gasoline-Electric—35-Ton
Propane-Electric—70-Ton

One Plymouth Model KC Flexomotive, 65-Ton, Standard Gauge, Type 0-6-0, Built 1940

Send us your inquiries **We Buy Freight Cars for Dismantling** ***Send us your offerings***

IRON & STEEL PRODUCTS, INC.

REPAIR PARTS For All Types of Freight Cars

General Office
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Phone: BAyport 1-3456

New York Office
50-D. Church Street
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Phone: BEekman 3-8230

STORAGE TANKS
6,000 Gallon
8,000 Gallon
10,000 Gallon

"ANYTHING containing IRON or STEEL"

RAIL
STEEL PLATE
STRUCTURALS, PIPE,
TUBING, WIRE ROPE,
FERROUS AND NON-FERROUS SCRAP

BOUGHT-SOLD LIQUIDATED

DULIEN STEEL PRODUCTS, Inc.
of Washington
9265 E. Marginal Way • Seattle 8, Wash. • LAnder 6000

For Sale

COLD FINISHED BARS

21/32"	Rd. 10/12'	51100	14250 #
1-13/16"	Rd. 10/12'	52100	6500
2-1/16"	Rd. 10/12'	B1112	2650
27/32"	Rd. 10/12'	52100	700

HOT ROLLED BARS

1-3/16"	Rd. 10/12'	52100	7000 #
3½"	Rd. 10/12'	52100	3400
3¼"	Rd. 10/12'	4320	1500
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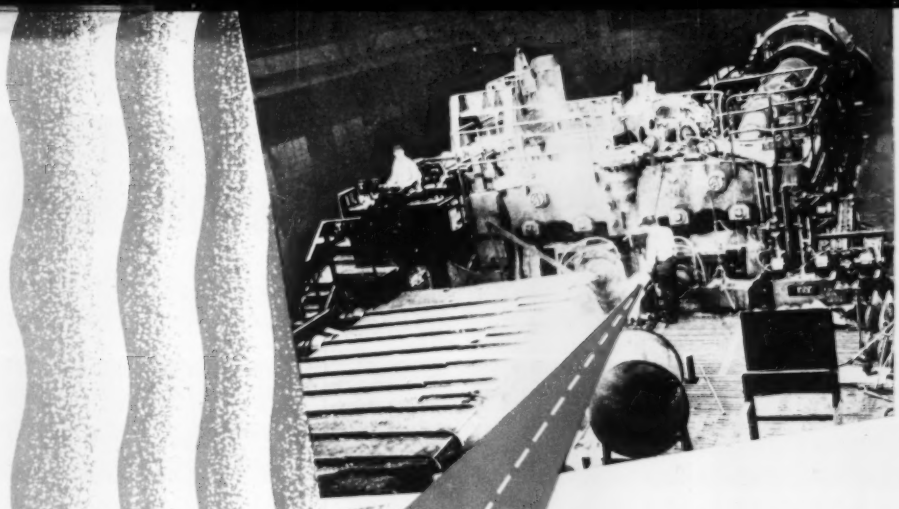

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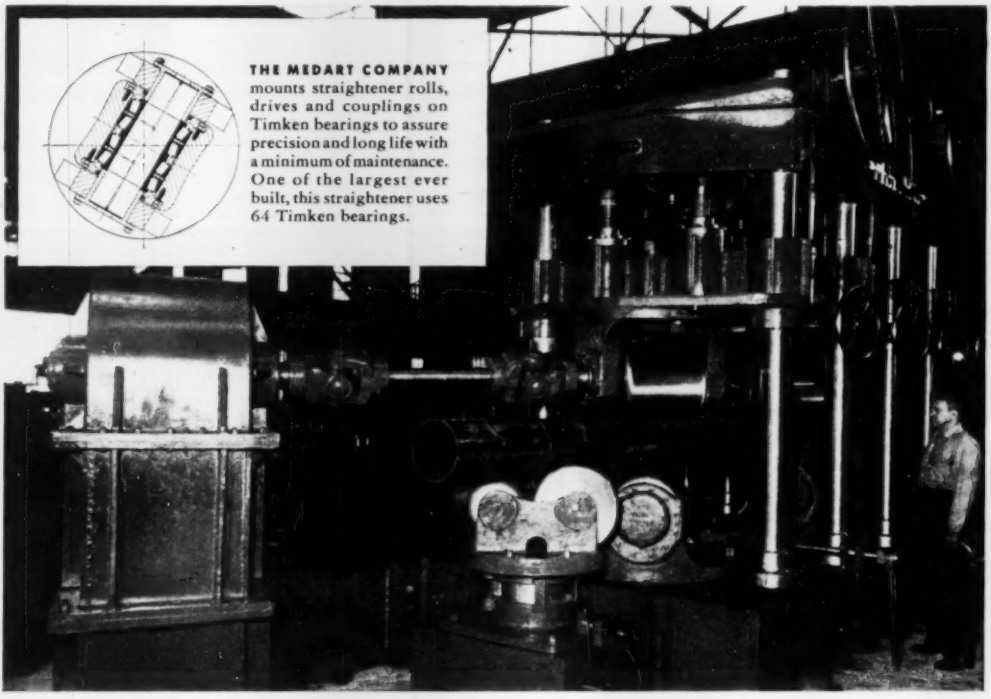

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